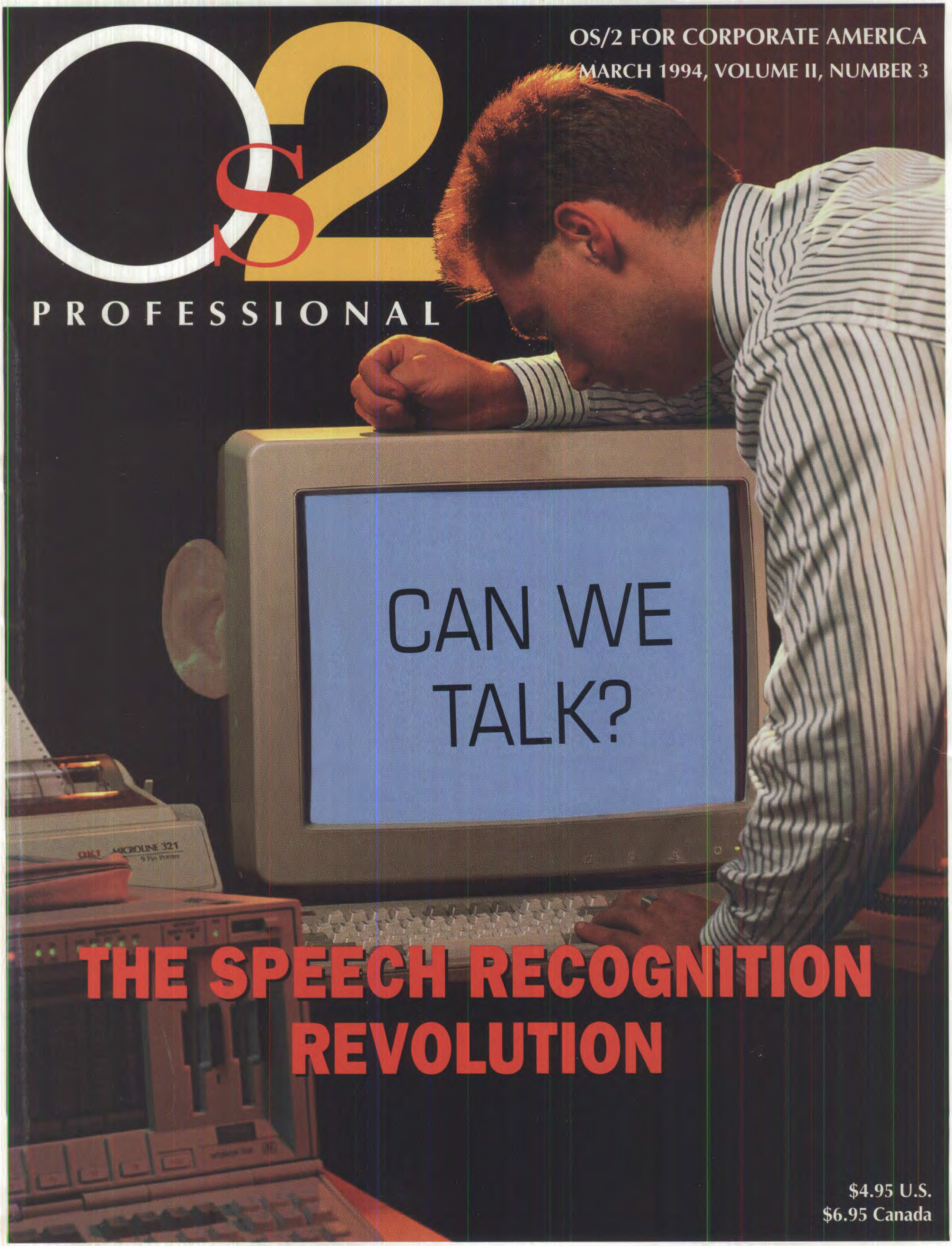
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MARCH 1994

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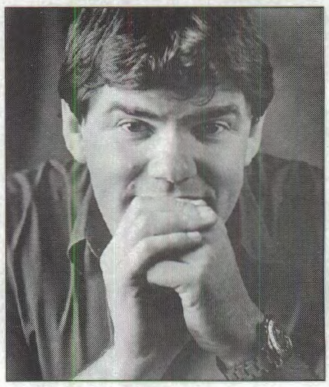
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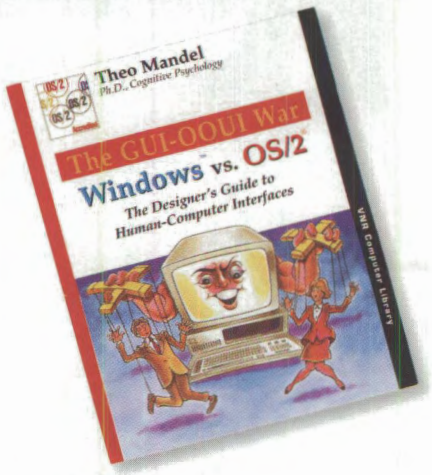
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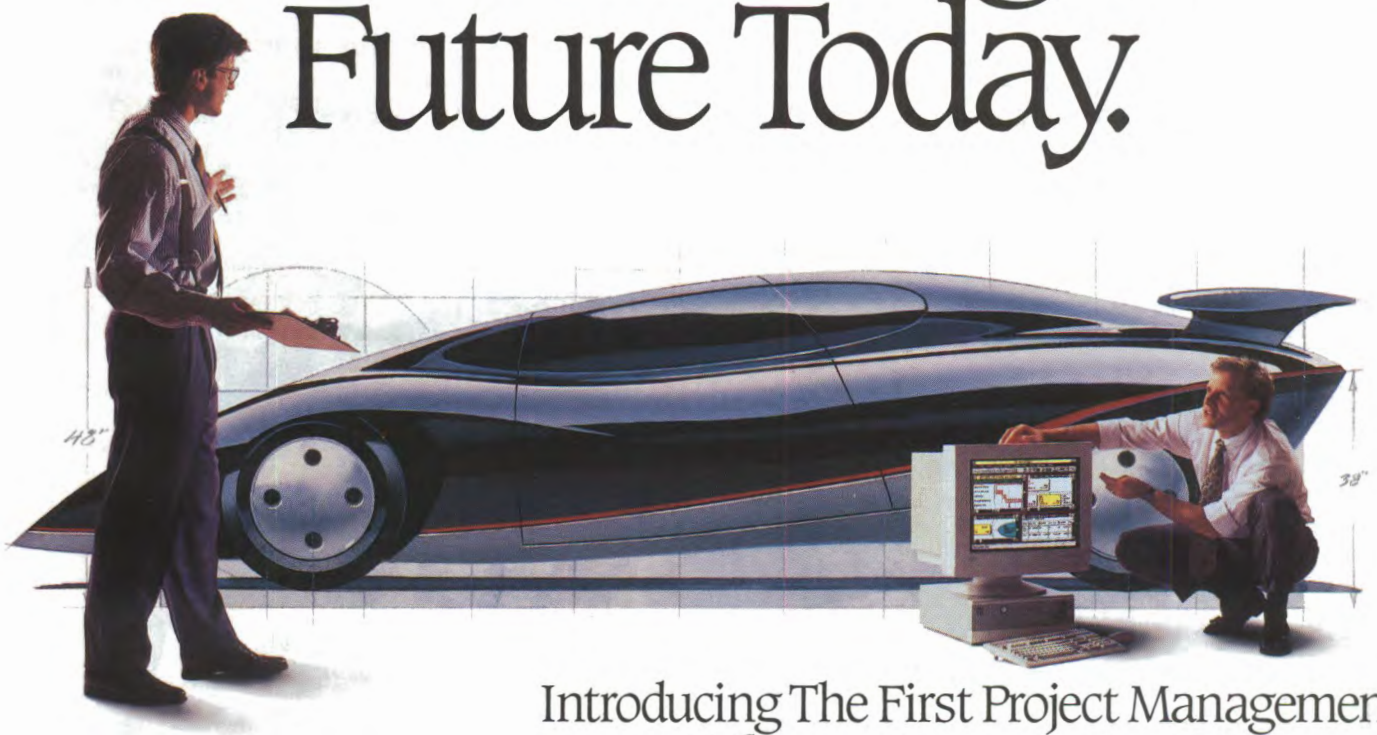
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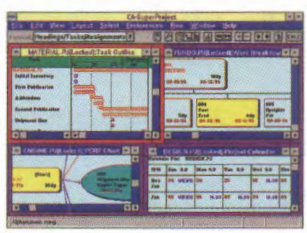


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Circle #122

PUBLISHER'S MEMO

A $500 Million Wake Up Call

Lou, are you listening? That whooshing sound you hear is the sound of a billion dollars blowing out of IBM's treasury and into a questionable enterprise called the Workplace OS. Is there any chance at all of earning back that original investment, let alone a profit? Few think so.

What else could Lou do with an extra half billion at a time when his bean counter-in-chief is trying to save sums as small as $70,000 by streamlining envelope purchases? Try listening to another sound, or rather a voice—the voice of IBM's future and undoubtedly the future of automation on this planet.

Speech—recognition, automation, and computing—is the new frontier, and a small dedicated staff of blue pioneers working out of a cramped IBM lab in Bethesda, Maryland, is chipping away at it a syllable at a time. As they succeed, corporate America will encounter striking changes in how it processes information.



No more popular image of voice computing exists than that of Capt. Jon-Luc Picard of the Starship Enterprise engaged in an animated question-answer session with the ship's computer. You may think such a scene pure Roddenberry, but in Palm Springs I saw Lois Dimpfel, head of the OS/2 lab in Boca Raton, use voice commands only to tell a graphics program to open a box, make it smaller—no, larger—and then shade it blue, no, bluer, and then red. About a month later, at Fall Comdex, I saw Alan Katzen, president of DeScribe, speak into a microphone as the words appeared on a screen.

Shortly thereafter, at IBM's Bethesda lab, I saw someone ask the computer for a list of flights from Los Angeles to Washington, and then narrow the selection to nonstops, and eventually to the perfect dinner flight—all using speech only.

Imagine what widespread voice computing will mean to corporate and institutional America. Training costs will plummet. Detectives will cross-examine criminal information databases in search of a suspect. Auditors can suddenly appear in the office of a newly acquired firm and within a few moments instruct the system to stop issuing purchase orders and produce summaries of all contracts.

Foreign offices will be able to work in a multiplicity of languages with simultaneous translation and execution of commands. Indeed, Globalink will later this year marry its translation software to IBM's dictation program. Customers of all inflections will be able to order merchandise by phone using a voice system that processes the order and bills your credit card. Indeed, voice billing could become common, with a personal code word replacing your 16-digit credit card numbers. Voiceprints could replace PINs as a means of instant financial identification.

How many more computers will be sold when anyone who can speak will be ready for personal computing? The slogan "joining the computer era" will be replaced with the truth: the computer revolution will have finally joined the human race.

And best of all, we can throw away those stupid mouse devices and free ourselves from our keyboards. Think of the billions that will be saved in carpal tunnel claims. Think of the foregone pain as the explosion of repetitive stress injury is dramatically reversed.

The technology is here; we detail it in this issue, starting on page 26. Lou, for the sake of your company's own future, latch onto SR. Make it Job One. And just to make sure you do, I'm faxing a copy of this article to Bill Gates. Now there's a horse race that could help change the world, not just distract it. Speech recognition sounds good to me.

Before I go, I want to sound off on two other key developments, for our magazine and our readers.

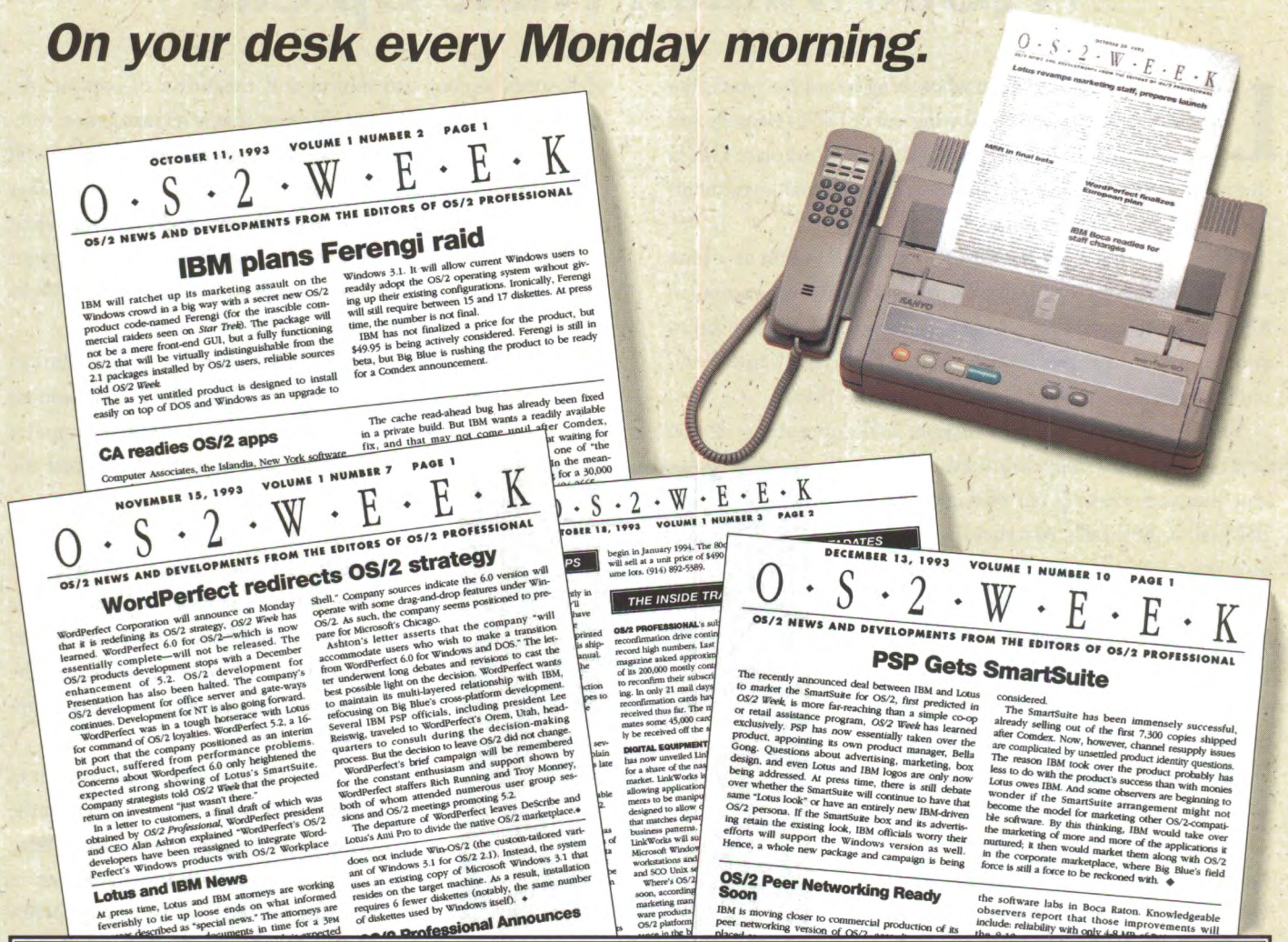
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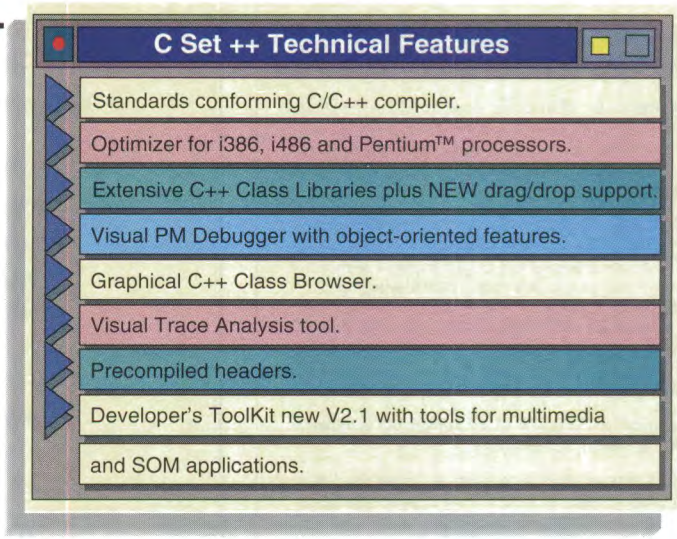
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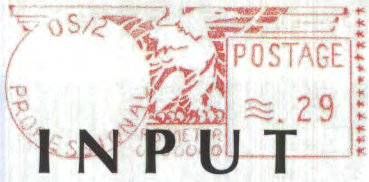
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INPUT

Comments, criticisms, and observations

Bug spray

First things first: You have a great magazine. In the article, "Novel Bug" [Bytes & Pieces, December], you described how you had discovered a "bug" in OS/2 dealing with how it runs programs with the same name. This is not really a bug, but a thing called Precedence. Like mathematics, there has to be a certain order in which things are done. OS/2 runs programs that have the same name in this order: .COM .EXE .CMD .BAT. I do not think this is a bug but a necessary thing. DOS does the same thing, but without the .CMD being available.

Scott P. Johnson
Westfield, New Jersey

[Editor Brad Kliewer replies: Precedence is certainly necessary. However, a command run from an OS/2 command prompt should give precedence to native OS/2 files before the DOS counterparts.]

Letter to IBM

I have been a user of OS/2 since it came out and upgraded to OS/2 2.1 in August 1993. I found the product to be of superior quality. I use OS/2 for all functions on my computer except for playing games. Running games under OS/2 is still a little twitchy.

However, my experience with the IBM Fulfillment Headquarters in Southgate, Michigan has not been pleasing in any aspect. I originally bought OS/2 2.1 on CD-ROM, but I could not get it to install with my Creative Labs' CD-ROM drive. I contacted Creative Labs' BBS but it was out of service because they were moving at that time. So I was unable to get a driver to operate the CD-ROM drive.

I contacted the IBM Fulfillment HQ and asked how I could return the CD Version of OS/2. I then followed their instructions and sent the package to them via the U.S. Postal Service with a Domestic Return Receipt.

I then went out and purchased OS/2 2.1 from a local computer store and sent in my card for the $30 rebate for upgrading from OS/2 2.0 to OS/2 2.1.

Since that time, I have yet to receive a credit on my credit card for the return of the CD-ROM version of OS/2 2.1, or my rebate check for $30.00. I have made numerous phone calls, letters, even a photocopy of the signed Domestic Return Receipt to the Fulfillment HQ with no results. I have gotten so frustrated that I contacted the Better Business Bureau.

I enjoy your magazine and OS/2 2.1. However, the Fulfillment HQ has left a bad taste in my mouth. I sent you this letter just to let you know how frustrating it can be to deal with faceless bureaucrats of a private company. It can be no better then dealing with the IRS, as we all know at tax time.

Paul Stemmler
Arlington, Virginia

[Editor's Note: If you've experienced these sorts of hassles with your retail channel, check out OS/2 Express, OS/2 Professional's new direct buying service. See pages 1-3.]

Answer to a Father's prayers

I am writing in response to Julia King's article, "OS/2 Zealot" [User Profile, December], which described Father Gregory's frustrated search for OS/2 programs. Lotus's SmartSuite for OS/2, which consists of the following integrated software packages: Lotus 1-2-3, Ami Pro, and Freelance Graphics, may be the answer to his prayers.

Sy Lieberman
Sherman Oaks, California

Object to awards

I've just finished reading the December 1993 issue of *OS/2 Professional*. I had to let you know how disappointed I was in your selection of the *OS/2 Professional* Awards.

In my association with OS/2 I have always felt that the weakest element of the operating system was IBM's incompetent marketing. In the beginning they nearly drove it into the ground by convincing almost everyone that it was necessary to scrap their current hardware and buy PS/2s in order to run OS/2. More recently they have stood by with dazed looks on their faces as the Microsoft marketing juggernaut has nearly destroyed OS/2 using nothing but smoke and mirrors.

Now I find you giving three of your nine awards to IBM marketing people! Why don't you give some recognition to the hundreds of IBM software engineers who have created this fantastic operating system? IBM's marketing organizations have consistently hindered OS/2's acceptance and they need a swift kick in the right direction. How dare you pat them on the back and tell them it's okay!

Bob Withers
MCI Mail

Translate this

I've just reviewed the November 1993 issue of *OS/2 Professional* and found it very interesting and informative. I'm encouraged by the many positive comments from users and developers. This is particularly encouraging because I happen to work for IBM.

The November Marketline article "Parlez-vous francais? Mais oui!" states, "...It [Globalink] is the only translation software available for OS/2..."

Well, I have news for Globalink! IBM has developed and has been marketing a software package called TranslationManager/2 for over one year (quite successfully, thanks!). It is a full-function professional translator's tool that just happens to run on OS/2 and takes advantage of many of the advanced functions of OS/2. It also costs a lot more money than Globalink and our users are delighted to give us their money.

Murray Moynes
CompuServe Mail

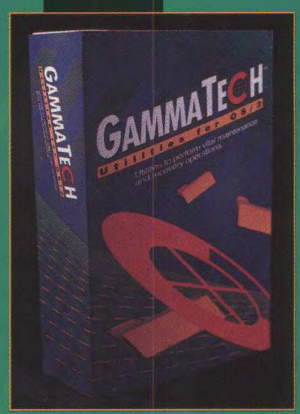
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BYTES & PIECES

News and trivialities, important and obscure

Workplace OS/2 timing uncertain



Developers and marketing executives are at odds over the timing of the beta release of the OS/2 personality for the Workplace OS, IBM's planned PowerPC operating system.

IBM has set a late June deadline for the start of beta testing and plans a general release in Q3, shortly after PowerPC systems become widely available. But development insiders say that despite intense management pressure, the code can't be readied that quickly. "It'll never happen," said one insider, who estimated the beta will ship at least two to three months later than scheduled. "Any attempt to get GA by Q3 will be pure folly," the source added.

The developers are under such intense pressure because of the need to rewrite from scratch entire libraries of device drivers—a need that reportedly led to a decision to give up the development of WOS-specific drivers and opt instead for the object-based drivers being developed by Taligent, Inc.

The other key factor likely to delay the WOS/2 code is IBM's hope that it will be able to run existing 16- and 32-bit x86-based applications. Under current plans, apps will have to be recompiled—and 16-bit apps first converted to 32-bit OS/2 code—to run natively in the RISC environment.

Reports of a possible delay are worrying application developers, who want the WOS/2 code as soon as possible to be able to have products ready before the next onslaught from Microsoft, which will first port NT to the new platform and then release its object-oriented Cairo product to run on the PowerPC.

Vendor Council moves apps to the end of the aisle

Some 40 ISVs determined to boost the visibility and sales of OS/2 applications have formed the OS/2 Vendor Council and kicked off a new advertising campaign. The ads promote the availability of their products in CompUSA, Egghead Software, and also through mass circulation catalogues like MicroWarehouse, Indelible Blue, and the Corner Store.

The campaign, jointly purchased by about a dozen council vendors, mostly small developers, is not cheap—it will cost the ISVs upwards of $80,000 per month—but it has already earned them some results. Tony Pereira, the owner of Clear and Simple, Inc. who is serving as the council's coordinator, succeeded in convincing two retailers mentioned in the ads, CompUSA and Egghead Software, to display the merchandise in a coveted "endcap" position, putting some 25 OS/2 titles at the ends of display aisles.

Putting together the deal was a challenge for the council. But Pereira, who coordinated the advertising and kept fellow council members informed while continuing to operate his business, says he considers the effort well spent. He expects dividends as the increased visibility of OS/2 apps spurs demand, which in turn will stoke the production of more and more titles.

Lotus ships Ami Pro 3.0a

Lotus Development Corp. began shipping Ami Pro 3.0a for OS/2 last month, shortly after plans for the upgrade were first reported by *OS/2 Week*. The upgrade from Ami Pro 3.0 for OS/2, which first shipped in November, addresses several customer requests, particularly the word processor's need for better performance speed.

Based on Lotus's internal benchmarks, the new version runs 160 percent faster in executing the New File command and 80 percent faster in opening and saving files.

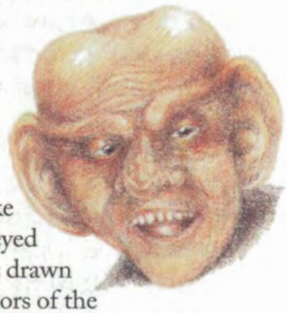
The Ami Pro upgrade has also been incorporated into the Lotus SmartSuite for OS/2.

Lotus is offering the upgrade for both Ami Pro and the SmartSuite free of charge to registered users who call 1-800-TRADE-UP, ext. 9477. Installing the update will preserve users' data and existing macros.

Upgrades to two of the other SmartSuite for OS/2 products, 1-2-3 and Freelance Graphics, are currently undergoing beta testing and should ship in April.

Beam me up!

What is this thing IBM has with *Star Trek*? Remember Borg, the code name for OS/2 2.1? And then there were Worf and Warp, and of course Ferengi, now known as OS/2 for Windows.



IBM may like the sense conveyed by using names drawn from the corridors of the Enterprise or Deep Space 9, but the same can't be said for the folks at Paramount Pictures Corp., which owns the trademarks and copyrights to the long-running series. Reliable reports have it that Paramount officials feel its legally protected names are being exploited or diluted—particularly given the exposure these code names have gotten in the press, notably this magazine and its sister newsletter, *OS/2 Week*.

Given the extent to which *Star Trek* references have entered common usage, misuse of Paramount property by IBM would likely be a difficult case to make. Nonetheless, some IBMers are beginning to consider code names outside the *Star Trek* lexicon.

Which raises an interesting question: What source of new code names would best epitomize today's IBM and the products it's developing? What movie, or TV series, or old radio show, or scenic part of the world, or recent war, conveys the right tone?

Do let us know. Given the other major set of product code names we've been exposed to—the images called up by city names such as Chicago and Cairo can't really be the ones the developing company wants to suggest, can they?—there's plenty of room for creative improvement.

Oh, yes—skip the colors also. In other words, don't think Pink. ◆

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OS/2 Applications Prospects

One ongoing sore point for OS/2 is the very limited availability of native 32-bit applications that fully exploit the potential of the operating system.

To be sure, a steady improvement has taken place over time. A few individual OS/2 applications are arguably "best of breed" across all operating system platforms. Creative System Programming Corporation's Golden CommPass navigational program for the CompuServe on-line service and DeScribe Corporation's DeScribe word processor are two examples. There are also some terrific development tools and utilities for OS/2, among them IBM's own C/Set ++, KaseWork's KASE:Set, HockWare's VisPro/REXX, and Digitalk's Parts Workbench.



Nevertheless, when it comes to applications, OS/2 still lags behind Windows and DOS. There are far fewer OS/2 titles. Those that are available more often than not trail their DOS or Windows counterparts in features and functions. And the performance of 32-bit OS/2 versions of applications tends to be worse—sometimes considerably worse—than that of 16-bit DOS or Windows versions.

What's wrong? If OS/2 really is such a terrific applications platform, why aren't more terrific applications available by now? Is there something fundamentally wrong here?

Lingering Doubts

The most obvious and probably most important reason why more applications aren't available is, simply put, that people doubted OS/2. Until recently, the predominant view among analysts, market researchers, and the trade press—and therefore software developers as well—has been that OS/2 just wasn't going to be successful enough to provide an applications market large enough to be worth the bother. (The proper cure for that malaise is extremely simple and is entirely up to IBM: get lots more people to use OS/2.)

As I've pointed out in the past, the relationship between hardware and software platforms isn't what it is generally assumed to be. It isn't so much that "killer apps" make particular hardware or software platforms successful, but rather that platforms that are successful in the market attract applications developers. The platforms that software developers do target are not a leading, but a lagging (or at best coincident), indicator of platform success. In short, if you build it (where *it* is an active installed base of, say, 10 million or so platforms in active use), they (the applications developers, that is) will indeed come.

Windows 3.0/3.1 really did not attract a broad selection of applications software until well after it had passed through the 10 million shipped number. Windows applications sales during 1990 and most of 1991 lagged far behind Microsoft's claimed shipments of Windows 3.0. Early adopters of Windows (those prior to, say, 1992) initially used it primarily as a GUI shell to run DOS applications, and they were nearly as starved for "native" Windows applications as the early adopters of OS/2 have been for native OS/2 apps. It was late 1992 before Windows applications sales really took off, and it was not until 1993 that they began to catch up with Windows' installed base.

Quick Ports, Naive Assumptions

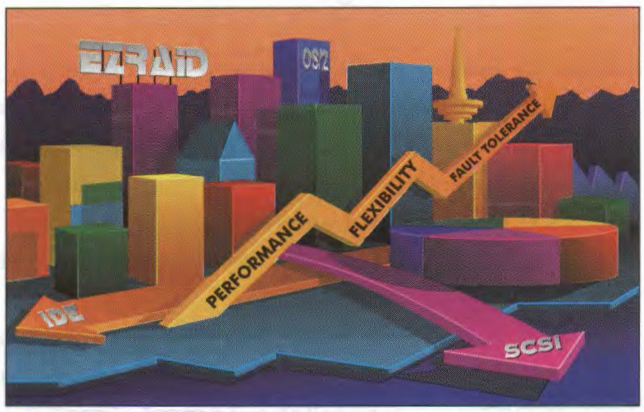
There are a number of key reasons why many initial OS/2 application offerings performed relatively poorly. Many developers initially relied on quick and dirty ports of DOS or Windows apps. A number of naive assumptions also were made about the supposed performance advantages of 32-bitness. And in more than a few cases, developer efforts to take advantage of the presumably "advanced" features of OS/2 exposed their limited grasp of what really was required to get first-rate performance from a more capable operating system like OS/2. In total, these added up to a failure to negotiate the learning curve into the new OS environment—or a failure to try at all.

None of this, it should be noted, is peculiar to OS/2 alone. Microsoft's Windows NT has suffered from all the same problems and, so far at least, to an even greater degree than OS/2 has. The 32-bit multithreaded nature of both operating systems requires a substantially different architectural approach to effec-

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tive applications development than does the single-threaded 16-bit model in Windows 3.1.

In fact, 16-bit DOS and Windows applications will need to be fundamentally re-architected to deliver first-rate 32- bit performance while exploiting the multithreading and other capabilities that OS/2 (and NT as well) offers. In the case of OS/2, there are further requirements to take advantage of the object-oriented potentials of the System Object Model and the Workplace Shell. NT will acquire its own set of more advanced OO features with the planned upgrade to Cairo sometime in 1995.

A Substantial and Growing Market

Hence the "feature lag" between OS/2 applications and DOS or Windows versions of the same apps. Most software developers haven't yet given OS/2 applications as much priority as they have their Windows applications because of OS/2's much smaller installed base thus far. In addition, most of them have had difficulty mastering the new environment and re-architecting applications for it that deliver first-rate performance, further discouraging them from the attempt. WordPerfect Corp.'s decision to back away from OS/2 development is a very good example.

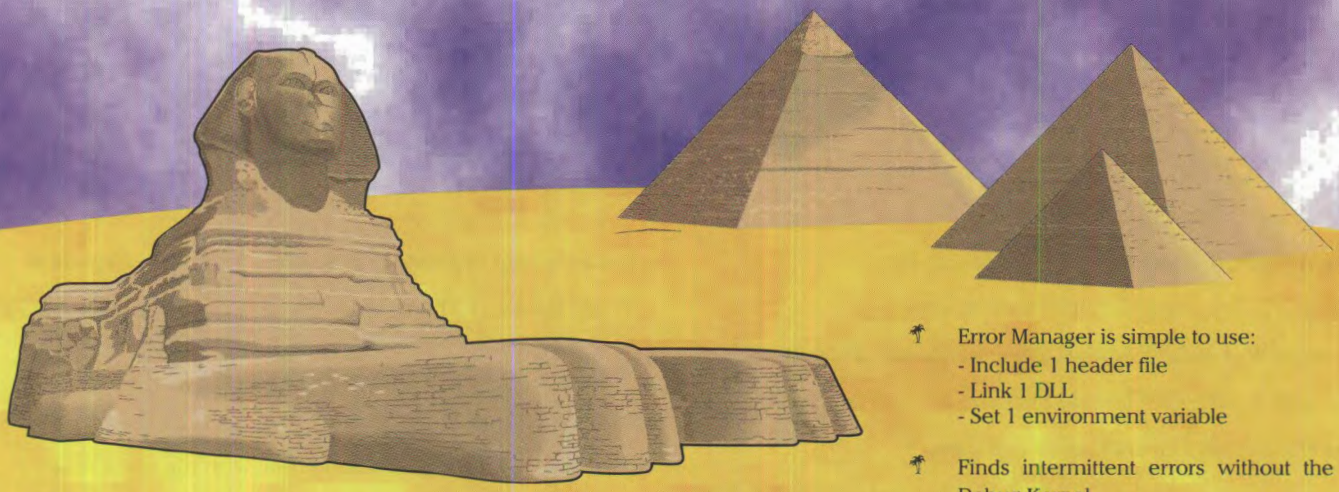
A product like DeScribe or Golden CommPass, however, clearly shows that it is possible to deliver good performance in a native OS/2 application if you know what you are doing. Moreover, this evidence suggests that a good OS/2 application will find a substantial and rapidly growing market. Lotus, despite "teething" problems with Ami Pro 3.0 for OS/2, clearly understands this, too, and is solidly committed to bringing its OS/2 SmartSuite of applications in synch with the Windows version, both in features and in performance. The new upgrades are evidence of that.

The bottom line is that the still rather limited selection of OS/2 applications will not trouble OS/2 or OS/2's supporters for very much longer. The installed base numbers are growing steadily. More and more applications (and more good ones) are appearing with each passing month—FastBack for OS/2, for example, and the upgraded version of Ami Pro. Developers increasingly are learning what is required to turn a single-threaded 16-bit application into a first rate 32-bit multithreaded application. The power of SOM and OS/2's Workplace Shell are being more widely understood and more effectively exploited as time goes on.

In addition, OS/2 is still the only game in town for those who want to run a real operating system on the Intel-architecture IBM and compatible personal computers they already have without adding gobs more memory. And it will continue to be this way for some time yet. The good stuff is only beginning for OS/2! ◆

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Error Manager tracks the OS/2 Toolkit API functions. Errors can be ignored, logged to a file, pipe, or our PM viewer. Additionally, EM can notify your window handle or callback function, allowing even novice OS/2 programmers to implement a sophisticated, event-driven error handling strategy.

EM works with all 32-bit OS/2 C/C++ compilers.

Error Manager simplifies all phases of the development cycle. Whether you use the logs to evaluate the performance of your beta, implement event-driven error handling or simply use the provided PM Viewer as an additional debugging tool, you will gain tangible benefits the first day you use Error Manager!

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Q & A

A straight-talk interview on topics of professional concern

Philippe Kahn: Pursuing the OS/2 Paradox

In a no-holds barred interview, Borland International's CEO talks about IBM, the OS/2 marketplace, and the future of his tools and databases.

Edwin Black: Philippe, tell me about yourself.

Philippe Kahn: I was born in France 41 years ago.

After the War. You're Jewish. Was your family dislocated?

My mother survived Dachau, Buchenwald, and Auschwitz.

She was deported from France to a camp?

She was a captain in the French Resistance and got busted. My father flew away to Africa and fought with the French Foreign Legion against the Germans.

So your parents were both fighters.

Yep.

How did you come to the states?

In the summer of 1982 I came looking for a job.

Did you find one?

Several, but I didn't have a work permit. So I ended up doing little jobs fixing computers. And I was fortunate enough that with a couple of friends we built a very good software product. One day we tried to sell our product and customers started to buy it and that helped us build the company.

The company was called Borland?

That's right.

What does Borland mean?

Borland means land of the deep forest—it's really an old Celtic-Russian name.

Why would you use that name?

Because we're located in a spot in California where there are giant Redwoods—deep forests—and the word just felt right.

Tell me about the history of Borland International and OS/2.

When IBM and Microsoft were still working together on OS/2, IBM approached us and this resulted in an agreement for us to develop Sidekick 1.1 for OS/2.

What happened to that product?

IBM shipped it for quite a long time with the first OS/2 1.1.

Is it still shipping?

Well, no, because it was a work-for-hire that we did for IBM. Then we looked at different things and made an agreement with IBM to do two more products, ObjectVision for OS/2 and Borland C++ for OS/2. We're very gratified about the success of Borland C++ for OS/2.

What happened to ObjectVision? You stopped development. Any chance that decision will be reversed?

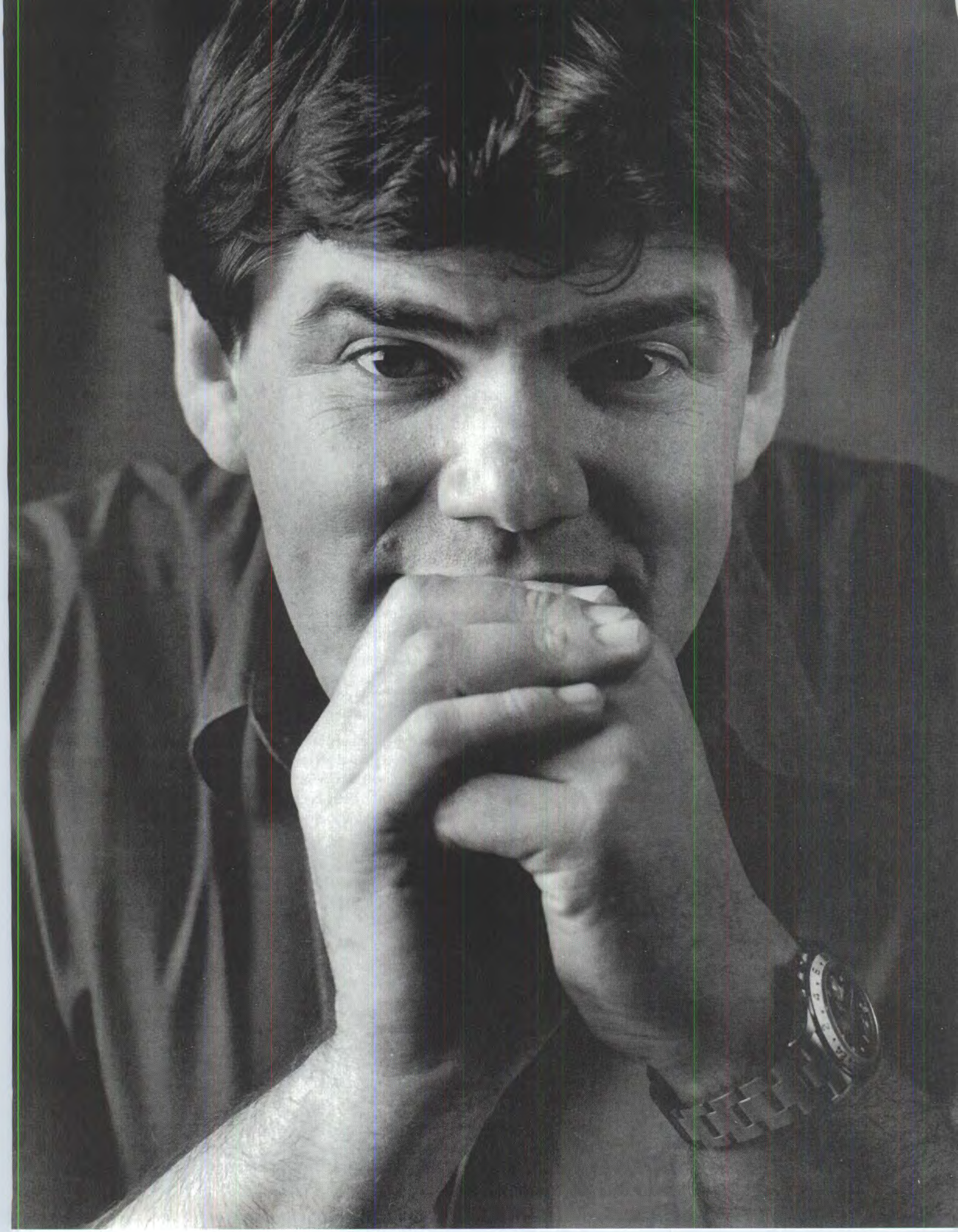
On ObjectVision, we decided it wasn't the appropriate product for the market. Borland C++ was the way people wanted to do development so we focused on Borland C++.

I think it's also important that both these products were work-for-hire just as Sidekick was and IBM, as I understand it, did not renew the ObjectVision agreement.

I don't think I would blame it on IBM. Both companies decided that Borland C++ was the important product, and they weren't really works-for-hire but rather agreements that both companies made to help each other.

Don't those agreements call for IBM to buy a certain number of copies? And to fund the development in certain other ways?

Not exactly. I think you know that those are confidential agreements and I don't think we're supposed to say what is in the agreement.



Well, you don't have to fax me a copy of the contract, but the fact is that these are two products that rely upon a joint agreement between IBM and Borland, and IBM has to have the financial wherewithal to ensure that these products continue. You're not going to go off and do this by yourself as an independent developer.

Yes, there are some agreements and we're satisfied. I think they're working out just fine—Borland C++ is a really good deal for both companies.

How about Turbo Pascal? Any chance for a compatible version for OS/2?

Because customers are asking for more OS/2 products, we are looking to get an option from IBM to do other products, whether it's Paradox or something else such as Pascal. Do you think that's a good idea?

Paradox would be fantastic—I would be your very first user. I think that everyone from John Soyring down has been publicly and privately urging you to run Paradox for OS/2. But let's be fair. When you ask: "Is it a good idea?" you well know that many people for better than two years have been asking Borland to do just that and they have been saying: "It's a good idea!"

Yes, as always we need to look at what our resources are. But you know we're beginning to think that it really is a good idea.

When you say it depends upon "our resources," the reality is that it depends not upon your resources but upon the resources of IBM. If IBM is willing to commit the resources to your company then you'll commit the resources to the Paradox project. Correct?

There has to be some mutual benefit to working together. I agree that because OS/2 does not have the popularity yet of an operating system with a larger installed base, IBM is important in that role.

So when people say we're waiting for Philippe Kahn to make the right move on Paradox, would we be wrong to say that Philippe Kahn is waiting on IBM to make the right move on Paradox?

Maybe the right image is that we're like two partners, two people in a dating situation with neither one making the initial move.

As we stand here now in the middle of a frigid January, you are not able to tell me with any certainty that there will be a Paradox for OS/2 in 1994. Correct?

No—I mean that the decision has not been made and that it really depends on the agreements between IBM and Borland.

Are you close?

Can't comment.

Are the negotiations active? Meaning, has there been a meaningful exchange in the last 30 days?

Yes, there is some exchange, some stuff is being pursued.

The Paradox application language and dBase are really becoming more similar. Do you think they will eventually merge into a single language?

Paradox and dBase are both great products that represent different constituencies and have different goals. Therefore they will remain different, just as English and Spanish are different and will remain different.

How about Interbase?

We have a vision we call upsizing. Interbase is what we call the upsizing server. Downsizing tries to crowd mainframe applications onto the desktop. We're trying to take desktop applications and move them into client/server. Interbase would allow you, for example, to take *OS/2 Professional's* Paradox-based lead tracking application [Magman] and suddenly run it in a client/server environment. Just run it against Interbase. So it's really a unique offering. We're announcing Interbase 4.0, which is a major step in that direction. Interbase 4.0 will be available under OS/2 in the second half of 1994.

Do you have any other OS/2 products currently in development?

At this point we're really focusing on Borland C++. Towards the end of March, you'll see an exciting new upgrade of Borland C++ for OS/2, probably named version 1.5. As I say, we're very pleased with the reception of the compiler on OS/2.

People generally call you a friend of OS/2 and I know you identify as a friend of OS/2. But all the initiative you have taken for OS/2 is basically contingent to a large measure on IBM. So what do you believe makes you a friend of OS/2?

I think we have been supportive since the beginning. We think OS/2 is a very good product and on its merits OS/2 is certainly a better product than Windows—no question. The issue for us is that it has not been completely clear how Borland can make money on OS/2. People don't sell much OS/2 software through retail outlets or other traditional outlets.

Isn't it a fact that an independent developer just can't make any real cash money off OS/2 unless IBM in one way or another puts up the dough, whether the name of the company is WordPerfect, Lotus, or Borland, or some tiny ISV?

It's a tough question. It's difficult because the volume is not there yet. But I think it could be there. I think we need the help of IBM with marketing to the customers. I'll give you the example of Quattro Pro for Windows. In the last four months it has sold over a million copies—that's the kind of reach we're talking about. After its first year, Paradox for Windows also will have sold close to a million copies. I don't think that any OS/2 product could sell more than maybe 20,000, 30,000, 50,000, or 100,000 to 200,000 copies per year.

Let's talk about the press. You live a very public life, you're a likable guy. But you've been getting some bad press lately. I was astonished to see a suite of negative articles in *Infoworld*



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coming down on your butt. And that's just part of it. What's the problem?

You'll have to ask *Infoworld*. As a company we've made decisions to serve customers, to focus on that and to focus on the next quarter. As a consequence, we focused on market share, the quality of our products, and our long-term strategy. We upset Wall Street because we told Wall Street, "Well, we're not going to have a great quarter. We're not going to have a bad quarter, but we're not going to have a great quarter because we're focusing on this long-term view." So to some extent we're not the favorites of Wall Street.

To be honest, Philippe, we had the impression you've been avoiding an interview with *OS/2 Professional* for about a year now. We've been stood up twice. Was that an accident of scheduling? Are you gun-shy?

No—well, I'm not sure. I wouldn't take it personally. To a large extent I had asked our PR department to focus all of our press activities on customer product solutions rather than on Philippe-type interviews, because it seems that the only thing people want to write about is not meeting Wall Street's expectations. So I'm telling our PR guys that all these articles just don't lead anywhere. Our focus has to be on technology, our long-term picture, and the fact that we're building the products our customers want. Do you understand what I'm saying?

Sounds like you were saying you are avoiding interviews to concentrate on technology issues and not on personality issues.

Yes, I don't enjoy all this public stuff. I just want to talk about products, about technology. So I'm trying to get away from Philippe-type "personality" articles and focus on talking about what our customers want.

Let's do that right now. Tell me the next big thing Borland is going to do for its customers.

We just announced that we shipped over a million copies of Quattro Pro last quarter and that our cumulative market share for spreadsheets has doubled in the last four months, and for the last quarter we've passed 40 percent market share. We've turned Quattro Pro into the best-selling Windows spreadsheet. We're also working really hard on getting dBase for Windows out in the next six months, which is very big for us. Interbase is growing, and an important business, and will launch our concept of upsizing. Fundamentally, Ed, we're a tools and a database company. We've always been that. We've been a technology company and we pride ourselves on our relationship to our customers and the fact that we offer the best tools and the best technology in the business.

And I presume that you hope that you can add Paradox for OS/2 one day soon to that list of accomplishments. Correct?

Absolutely.

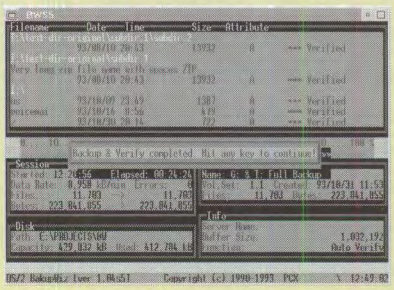
Thank you, Mr. Kahn. ◆

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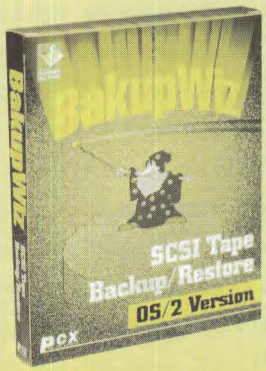
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Circle #123



The SPEECH RECOG

Has the time finally arrived when you will do

BY RICH MALLOY

There are two windows open on Hildreth Noronha's computer. The first contains German text—part of the instruction manual he is translating for his company, Eurosoft. As he dictates the English translation, the words begin appearing in the second window. Despite his slight Indian accent, the computer understands him almost perfectly. When he is finished with the section, he says, "Stop dictation. Copy to clipboard." Then he clicks the mouse in the first window and says, "Paste." The English text instantly replaces the German.

Noronha has been using a beta version of the IBM Personal Dictation System (IPDS) for only a month. He is still teaching it the technical terms that appear frequently in his work. But already he says that the software has made him 20 to 25 percent more productive. "This is the killer app that IBM should push," says Noronha.

That's an interesting marketing insight, since the IPDS is an OS/2-based application and Noronha is hardly a dyed-in-the-wool OS/2 user. After he saw PDS demonstrated at a trade show, he immediately applied to become a beta tester and made the switch from Windows to OS/2. "The move so far," he says, "seems to be the best thing that I could have done."

IBM's recently released PDS product is part of an exciting new wave of powerful speech recognition products that will probably change the way you use computers. If you think this sounds a bit far-fetched, the rapidly evolving state of the technology requires that you think again. According to Harry Nielsen, president of system developer Natural Input Technologies, "Speech input is here."

Standard on New PCs

Says Nielsen, "I used to say that speech input is where the PC was in '82. "Now," he says, "it is where the PC was in '89. It is usable and cost effective. It makes a PC so much easier to use."

These sentiments are backed up by analyst William Meisel of Encino, California, publisher of the *Speech Recognition Update* newsletter. According to Meisel, "Speech recognition took off in '93." According to his figures, more systems shipped in 1993 than in all previous years combined.

Why all the sudden commotion over this long-hyped technology? First, there have been steady advances in the algorithms used to solve the complex process of recognizing speech. Meanwhile, the horsepower on the average PC has increased tremendously. No longer do SR users need to buy expensive coprocessor boards to get acceptable performance. Nor do many users have to purchase microphone input adapters, since the popularity of sound boards means millions of PCs already are microphone-ready. Finally, as the feasibility of speech recognition becomes real, more competitors are joining the market, forcing prices to drop.

The result will be that by mid-year, simple speech recognition will be a standard feature on most new PCs. And with the maturing of the technology, even the most advanced speech recognition technology will be a relatively inexpensive option.

All of the big players are involved. IBM has three different families of SR products. Apple and Compaq have begun shipping SR-equipped PCs. And Microsoft includes SR capabilities in its Windows Sound System board. Sound board giant Creative Labs, manufacturer of the ubiquitous Sound Blaster board, says it ships 100,000 speech-recognition systems per month.

Meanwhile, ever bigger changes are developing outside the narrowly defined computer world. For example, all three major long distance companies have begun to incorporate speech recognition into their services.

NITION REVOLUTION

work by talking to your computer?

The advantages of speech are obvious in situations where users do not have their hands free. SR is already finding uses on assembly lines, in package handling, equipment inspection, and certain medical applications.

The technology is also well suited for general office work because it speeds data entry. NIT's Nielsen says he had a bet with a co-worker that he could talk into the computer faster than the co-worker could type. "I whipped him," says Nielsen. "He owes me dinner."

Regarding accuracy, Nielsen acknowledges that one has to go back to correct things. The IPDS does sometimes select the wrong word. "But," he says, "there are no misspellings." And Nielsen says the application adapts to the user. "The more you use it," he reports, "the better it gets."

Voice Over Typing

As applications go, this one is neither dirt cheap nor wildly expensive—it lists for $990. Nielsen claims that given the improvement in productivity using SR, the payback for most IPDS applications, including those for executives and secretaries, is six months. He also stresses an unlooked-for, but very welcome, benefit of the technology: "It is going to do away with carpal tunnel syndrome."

One common knock on SR is the difficulty of using it in a shared work space. Several industry watchers have worried that if everyone in an office started talking to his or her computer, the resulting cacophony would drown out all but the loudest conversations.

The people promoting speech recognition dismiss this out of hand. Elton B. Sherwin, manager of speech recognition strategy and market development at IBM, admits that speech recognition is not suitable for places like libraries, or for taking notes in meetings. But, he says, "Speech recognition is appropriate in any place where users already use phones." Users of speech recognition systems, he notes, generally do not have to speak loudly to be understood. Larry Dooling, president of Verbex, says that his company's technology can differentiate sounds at fairly soft levels in relatively noisy environments. In fact, he calls the technology "Softspeak."

Four Types of SR Systems

Meisel, the analyst, identifies four types of speech recognition systems. The first and most readily obtainable are the discrete voice controllers. Examples are readily on display at your local retail outlet. These products have a limited vocabulary of discrete words (in *discrete* speech, there must be a pause before each word). They mainly are used to let you navigate around the Windows environment and Windows and some DOS programs. Discrete controllers are usually bundled with sound boards such as the Microsoft Sound System board and the Sound Blaster. IBM, through its direct retail marketing 800 number, offers two low-cost Voice Type products for Windows developed by SR pioneer Dragon Systems.

The second category consists of dictation and report generation systems, which are large-vocabulary speech-to-text products such as IBM's Personal Dictation System. These products allow you to dictate documents into your PC without using a keyboard. Other vendors in this market include Kurzweil and Dragon Systems.

The third type of SR application is the continuous command and control system. These systems generally have medium-sized vocabularies, on the order of 1,000 words, and can usually accept words spoken in a continuous, natural manner. These systems give the user more control over his or her system than does a sim-

The Technology: ICSS

BY WAYNE RASH JR.

Is it possible that IBM has found the Holy Grail of speech recognition with the IBM Continuous Speech Series? The answer is a definitive *maybe*. The product clearly does more than the competition, and remarkably it does it using fewer resources than most. In addition, it's relatively inexpensive and it works on a variety of platforms.

ICSS provides continuous, speaker-independent speech recognition. Developers can work with ICSS to enable applications immediately, and their end-users can walk up and use the ICSS-enabled applications without the need to train their voices to the system. Additionally, ICSS expects users to speak naturally, in a normal speech cadence, without having to pause between words.

ICSS has been on sale since last fall, and user response has been good. IBM's Ora Williamson says that a number of manufacturers have begun developing software using ICSS.

What You Get

ICSS is delivered as a developer's tool kit. This means that what you're really getting is support for your applications, along with a collection of specialized APIs. The package also includes several demo applications, sample code in C, and some support utilities. These include a comprehensive testing utility that allows you to check how your particular system is responding to the speech it's receiving and to tune it for optimum performance.

The testing utility is supplied because ICSS supports a wide variety of third-party hardware. We used the product with a Unisys 486DX/25 and a Gateway 2000 486DX2/66. In both cases we used a relatively old eight-bit Sound Blaster card from Creative Labs as the hardware interface. IBM says ICSS supports any sound card supported by the underlying operating system—in this case, OS/2. It also works with nearly any IBM-PC/AT-compatible machine whether or not it's made by IBM, as long as it has an 80486DX or DX2 processor and enough disk space and memory.

We used 16 megabytes of RAM on both machines. The exact memory requirements will depend on what you're doing with ICSS when you create applications. Installed, ICSS requires about 12mb of hard disk space, but by the time you install all of the demonstrations applications with their attendant sound files and vocabularies, that can grow to as much as 50 megabytes.

In addition to the Sound Blaster, we used Radio Shack model

continued on page 32

ple interface controller. For example, Verbex reports that a system it produces is used by UPS and the Postal Service to sort packages based on spoken commands. The system was chosen, according to a Verbex spokesperson, in part because of its tolerence for high noise levels. Other examples of these systems include the IBM Continuous Speech System and the system used by Apple Computer in its AV computer.

A fourth and very important category is the voice-based telephone system. These systems allow you to control a remote system by phone without having to resort to DTMF or TouchTone signals. This technology is currently more popular in Europe, where it is used for voice-mail systems since DTMF telephones are rare. Companies involved in telephone applications include AT&T, Voice Processing Corp., Voice Control Systems, and Lernout & Hauspie Speech Products.

Speaking of Multithreading ...

OS/2 is important to this brave new world of speech recognition—important, but not indispensable. Companies such as Dragon Systems and Verbex have shown that you do not need OS/2 as a platform for SR. But OS/2 does make things easier.

According to Clifford Beshers, vice president of technical development at Natural Input Technologies, the multiprocessing capability of OS/2 is important because it allows a developer to have the speech engine running in the background, speeding application processing time. Beshers says it would not be impossible for IBM to port its IPDS to Windows—but it certainly would be difficult. "It will take some wedging," says Beshers.

NIT's Nielsen agrees about the power of IBM's desktop OS. "If IBM weds speech input with OS/2, they will have the operating system of the future."

Jeff Hill, vice president of product development of Voice Processing Corp., says that his company uses OS/2 as a general development platform. VPC developed the voice recognition engine used in Creative Labs' Voice Assist SR software. This software is available bundled with the company's Sound Blaster 16 sound card or by itself. Hill notes that although the apps are launched in a similar way under both Windows and OS/2, "it has the feeling of being more natural under OS/2."

Tom Hunse, vice president of marketing for InterVoice, used OS/2 for the SR system of a long distance company's collect-calling service. "It was imperative that we have a mission-critical platform," he notes. Hunse reports that his company went through

a recent evaluation of hardware and software at Boca Raton. "We came away," he says, "absolutely revitalized about OS/2."

Future SR Products

Expect to see a number of interesting new products to debut this year. In March, Verbex will introduce a $99 software-only version of what it describes as its "industrial-grade" command and control system. Although not an OS/2 product, this software with its probable street price of $79 could make good SR virtually an impulse buy.

Creative Labs is considering an OS/2 version of its Voice Assist SR software, a product that could be released in the first half of the year. The company currently is considering marketing options for this product.

Around mid-year, IBM will offer a PCMCIA version of its Personal Dictation System. This version will allow PCMCIA-equipped notebooks to use the IPDS.

At approximately the same time, Lernout & Hauspie will introduce a speech recognition product that can handle free-format grammar—that can, that is, recognize sentences with the words in any order. For example, it can understand, "San Francisco, I want to go to" as well as "I want to go to San Francisco." This continuous speech, speaker-independent system has a vocabulary of 3,500 words.

The Holy Grails

According to NIT's Beshers, there are three Holy Grails of the speech recognition industry—three goals that a mature, successful technology must be able to satisfy for products to succeed in the market. The first is *continuous speech*, a system that does not require you to make a ... discrete ... pause ... before ... each ... word. The second is *speaker independence*, the ability of a system to accept useful input from a large number of people without having to be trained for each individual user. The third Holy Grail is, not surprisingly, a *large vocabulary*.

Today's speech recognition products can attain at best only one of these goals, typically the large vocabulary. Only IBM's Continuous Speech System can claim check marks in two categories: continuous speech and speaker independence. (See *The Technology: ICSS* at left.)

Extra processing power will allow more systems to attain a second Grail, and eventually perhaps all three. But however quickly and however closely future applications come to the ideal,

The Technology: IPDS

BY WAYNE RASH JR.

I'm writing this article using the IBM Personal Dictation System for the first time. As I speak, what I'm saying appears on-screen, each word a fraction of a second after I've spoken it.

From time to time as I speak, IPDS will choose one word, only to go back and replace it with another that more correctly fits the context of this article. In this paragraph several of the words are already wrong (I'll correct them in a few seconds), so IPDS obviously needs to learn a few things about how I use words.

Installation Takes a While

We initially tried to install the system on a low-end computer using an Intel 80486DX/25 processor. Unfortunately that machine was not up to the task and we ended up installing the IPDS on a Gateway 2000 486DX2/66. On the faster computer, the IPDS worked just fine. The IPDS requires OS/2 2.1.

Still, the IPDS isn't a package that you can simply toss onto your computer and begin using that same afternoon. While the actual loading requires only about a half-hour, the remainder of the installation process can require several more hours.

Installation takes place in three phases. After loading the disks, you'll need to run some system tests to ensure that the software communicates with the IBM Personal Dictation Adapter, a coprocessor board and sound card that handles speech for the IPDS. On ISA and EISA machines, you may need to set jumpers to select an appropriate memory address and interrupt level. On Microchannel machines, this process is handled in software by loading the Option Disk.

Then, once you're sure the hardware is working, you'll need to train IPDS to your voice, and incidentally, to train yourself to speak in discrete words. IBM provides two essays for you to read aloud to the machine, one that explains speech recognition (and in the process suggests strongly that continuous speech recognition is nearly impossible, which must interest the Continuous Speech Lab that produces ICSS), and the other a ghost story.

Learning Your Patterns

Once the training process is complete, your name appears on an icon on the OS/2 desktop. As you click on that icon to begin using IPDS, though, you need to bear in mind that the system learns while it works, so the first few paragraphs will be a little rough. We found, however, that the package will quickly learn a lot about your speech patterns and word usage. By the time we finished dic-

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speech recognition will unquestionably be an important—some would say critical, or even revolutionary—part of the computer world.

How Applications Will Change

One additional hurdle still remains to be overcome, though, before SR will be judged mature as a productivity technology. Most of today's software has been designed to be operated through a graphical interface. To take full advantage of speech recognition, software will likely have to be redesigned. According to VPC's Hill, "The last 10 years was the GUI decade. The next 10 will be the 'VUI' decade, or something similar."

Hill notes that a voice-based interface will be well-suited to handle the increasing complexity of software in a way that maximizes its utility. A moment's reflection reveals how right he could be.

Today, a GUI-managed application is likely to reflect the predilections of the app designer or the company family of which it is a part. Thus, the command to search for a character string or a word could be Alt-S in one software family but Ctrl-F or F3 in another; in graphical terms, it could be represented by a binoculars icon at the top of one screen, a magnifying glass to the right on another, and a bloodhound sniffing along the screen bottom of a third. Think how much easier it would be to know you could tell the PC, "Find the word recognition" or "Format the third paragraph using the text style."

Particularly vexing to Hill is the current profusion of toolbars. He notes that in one presentation software package he found a tool icon that looked like a medicine dropper. "I still don't know what that means," he exclaimed. "How do you look it up?

"If you will," Hill continues, "the desktop metaphor has succeeded too well. It has managed to duplicate the clutter on the desktop." In a voice-based system, you would simply call the tool by name.

Verbex's Dooling agrees that software will have to change. "Once speech becomes normal in a lot of machines, it would then make a great deal of sense to rethink applications in the context of being talked to." For example, "In speech, there is no reason to be hierarchical." Instead of saying, for example, "Open File Agency," which follows the order of menu options, you could say "Open Agency Letter." Says Dooling, "The stepwise menu is needed no longer."

S. Ming Lee, director of marketing for speech pioneer Dragon Systems, concurs. In time, he says, as key software developers and corporate developers begin to understand speech recognition, they will begin to make their apps "speech-centric." Remember, he points out, before the mouse became popular, developers designed only for the keyboard. To make things easier, he says, the industry wants to develop a set of special APIs for speech input.

At least one vendor of word processing software is already seriously considering speech input. Allan Katzen, president of DeScribe, says that his company could come out with a voice edition of its OS/2 word processor by the end of the year. DeScribe showed a demo, based on IBM's ICSS technology, at last Fall's Comdex show.

Proponents of speech recognition maintain that it already is the fastest way to input text into a computer. Speech input may become even more effective, claims IBM's Sherwin, if it is combined with another long-discussed technology: pen input. Sherwin notes that the two technologies complement one another, in much the same way a mouse and keyboard do.

Sherwin reports that the company did some benchmark studies in IBM's research labs a few years ago. "The fastest way to input text," says Sherwin, "is to speak it in and then edit it with a pen." He suggests that at some point in the future IBM will be shipping pen/speech hybrids.

Changing the Office

Perhaps the most important effect of speech recognition will be its impact, not on people who use computers, but on people who do not use them—yet. IBM's Sherwin says that as speech recognition gets better it will enable first non-typists, and then computer-phobes, to use computers effectively. "1994," he declares, "is the Year of the Non-Typist."

Supporting this view is NIT's Nielsen, who claims, "More people shy away from computers because of keyboards than anything else." He likes to point out that "the keyboard is a torture device invented in the last century."

One of the biggest changes that will be catalyzed by SR is actually quite small. Freed of the requirement for a keyboard, new notebook computers may be able to shrink significantly. All that's required for them to grow smaller is effective SR, and that in turn requires only more powerful chips, which are on the way. IBM's Sherwin notes that SR is a perfect application for the new PowerPC chips. "The next generation [of SR products] on PowerPC, I think, is really going to stun people." He follows this with an enticing hint: "We're talking *very* small."

Already, there are VCRs that accept speech input. According to Peter Foster, president of Voice Control Systems in Dallas, that trend will continue: "Just about every VCR will have voice recognition."

VCS itself is busy with other applications. It already has developed a voice-based telephone, with neither dial nor keypad, for Southwestern Bell. Developers are currently working on a voice-based business telephone that will replace the standard array of confusing buttons. They are having discussions with a lightswitch company about a voice-based lightswitch "beyond the Clapper." In addition, the company is working on a voice-based navigation system for a large German car company.

IBM's Sherwin pictures a more personal impact. He sees the new technology allowing people who are weak writers to write better. "There are quite a number of people who are competent at their jobs," he says, "but who are not good writers." The new technology will help by putting on screen the words of those who can speak well, just as the word processor helped people with bad penmanship or typing.

A Ringside Seat

Sherwin also sees SR as a big application in interactive TV. These systems will have just a cable and perhaps a cable box—but no keyboard.

The CD-ROM market is another area that should feel the effect. Since most CD-ROM-equipped computers have sound input capabilities, it is an easy step to add speech recognition. Judging by the interest software developers have shown in IBM's ICSS technology, Sherwin predicts, "Most CDs in the next two years will not only be multimedia but speech-enabled as well."

Not everyone believes that speech recognition will see explosive growth in the next few years. Bruce Ryon, Dataquest's multimedia analyst, tracks voice input-specific products (i.e., those products bought specifically for speech input purposes and not thrown in with other products such as sound boards or PCs). He predicts 25 percent growth year to year, but he doesn't see any dramatic changes.

Specifically, nobody knows what will happen in the future. But changes are indeed coming, and if they come anywhere close to living up to their hype, they will have enormous consequences, far beyond issues of how words get onto the monitor screen. Amidst the churn and the hype and the visions, however, one thing is certain: Whatever happens, OS/2 users will have a ringside seat on the action. ◆

COMPANIES INVOLVED IN SPEECH RECOGNITION

DRAGON SYSTEMS, INC.
320 Nevada St.
Newton, MA 02160
phone: (617) 965-5200
fax: (617) 332-9575
DOS-based SR products and technology

IBM
1133 Westchester Avenue
White Plains, NY
phone: (914) 642-3000
OS/2, DOS, and Windows SR products and technologies

LERNOUT & HAUSPIE SPEECH PRODUCTS
800 W. Cummings Park
Woburn, MA 01801
phone: (617) 932-4118
fax: (617) 932-9209
SR technology

NATURAL INPUT TECHNOLOGIES
26 N. Main St.
Cortland, NY 13045
phone: (607) 758-500
fax: (607) 758-5002
OS/2-based SR systems

VERBEX VOICE SYSTEMS
1090 King Georges Post Rd.
Building 107
Edison, NJ 08837
phone: (800) ASK-VRBX
fax: (908) 225-7764
Windows-based SR products

VOICE CONTROL SYSTEMS
14140 Midway Rd., Ste. 100
Dallas, TX 75244
phone: (214) 386-0300
fax: (214) 386-5555
SR technology

VOICE PROCESSING CORP.
One Main St.
Cambridge, MA 02142
phone: (617) 494-0100
fax: (617) 494-4970
SR technology

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40-1312 amplified speakers and a CAD 89 unidirectional microphone from Conneaut Audio Devices. To test the limits of flexibility for ICSS, we also tried out the system with the worst microphone we could find, an ancient Radio Shack model designed for use with its cassette recorders.

The first step to installing ICSS doesn't actually require ICSS at all. You must install your sound card and then the OS/2 multimedia drivers. These two disks, included with OS/2, let you tell OS/2 about the installation settings you want to use.

Once you've installed the OS/2 multimedia extensions, there's little to do beyond swapping disks as the ICSS Installer requests them. After the package is installed, IBM suggests trying out a couple of the demos. You do this by clicking on the ICSS folder and opening an icon labeled "Stock Market." This demo lets you make simulated trades of several stocks by saying things like "Sell 100 shares of IBM."

How Does it Run?

The demo files will provide you with a good barometer of ICSS performance on your target system. They told us a lot about how you can expect ICSS to perform in general.

First, don't skimp on the computer and expect to remain productive, especially if you're doing development. ICSS requires quite a bit of processing capability, and a slow machine will provide it too slowly to suit most people, even though ICSS will still function on it. In the worst case we experienced, response sometimes took 30 seconds. With the Gateway 2000 test system, there was no discernible delay between speech and action.

During the course of preparing this review, we observed a number of informal demonstrations of ICSS at IBM's labs in Bethesda, Maryland. In general, we found that using better equipment, such as 16-bit sound cards and faster computers, made a marked improvement in the operation of ICSS. You don't necessarily need a top-of-the-line machine. We'd suggest, however, that you restrict your use to 80486DX/33 machines and that you use a 16-bit sound card for optimum performance.

Using ICSS is as simple as talking. Once you click on an application you must simply speak normally into the microphone and the computer responds. How the interface works depends on the application, of course, but in the ICSS demonstrations, a button changed color to let you know the microphone was turned on. Once ICSS was running with the applications IBM provides, you can navigate using only voice commands.

Normally, there are two sorts of information you can provide by voice. One is a command to run an application or perform a function. The other is what you're actually trying to tell the system—to buy stock, for example.

Is It Worth It?

If ICSS has a downside, it is that it has a limited vocabulary. The system works with what IBM calls "contexts"—dictionaries that each contain up to 1,000 words. ICSS keeps a context in memory, and works fastest when the words it recognizes are drawn from there. However, ICSS is capable of loading as many as 128 additional contexts and switching to them if a word it recognizes is not in the current context.

This context switching means that the ICSS vocabulary is significantly less limited than might otherwise appear. The limitation is really one of memory and disk space, since a 1,000-word context requires something like 100 kilobytes.

Is ICSS the mature speech recognition system we've been waiting for? Not exactly, but with its support of true speaker independence and continuous speech, it's almost there. Context switching reduces, and may eliminate, any vocabulary limitations. The only real limit is on the power required to support it, and for most users, their current OS/2 workstation is plenty capable.

In short, ICSS is a significant product. It works as advertised, and does things that most observers didn't think was possible even a few months ago. It works with most hardware, and on most computers that run OS/2. If it's not the mature speech recognition system we've been waiting for, it's the next best thing. ◆

IBM CONTINUOUS SPEECH SYSTEM

IBM Corporation
6700 Rockledge Drive, Bethesda, MD 20817
1-800-TALK-2-ME
List price: $315

OPERATING REQUIREMENTS

PROCESSOR: 486 DX, DX2 or better or 486 SLC2 at 50mhz with numerical processor.

MEMORY (RAM): 5mb above that which is required for other purposes (at least 16mb overall is recommended).

HARD DISK (DASD): 12mb or more.

SOUND CARD: Any sound card supported by MMPM/2 or an IBM M-ACPA card; 16-bit sound cards are recommended.

MICROPHONE: dynamic, cardioid, or supercardioid recommended.

FEATURE

Multimedia: What's Missing?



Doing multimedia right requires a multithreaded, multitasking OS with a robust memory model. So why isn't OS/2 the platform of choice?

BY JOHN BATTELLE

Flanked by a smart-looking publicity director and the gray, buttoned-down walls of his company's booth, Arnold Waldstein straightens his tie and assumes a diplomatic posture.

Waldstein has come to the Winter Consumer Electronics Show to sell products, after all, and not to be asked his opinion of OS/2 as a multimedia platform. True, his Creative Labs has established a pre-eminent position in multimedia, but its business is hardware, not operating systems. And even though the lion's share of Creative's business is driven by Microsoft Windows, his company is no platform bigot.

But the polished marketing director is not one to be at a loss for an answer. "Let's put it this way," he said, in a confidential tone. "IBM is a great technology company. Microsoft is a great marketing company. Microsoft is very hard to compete with."

Wait a minute, I thought to myself. That's avoiding the question. I didn't ask about the comparative marketing plans of IBM and Microsoft, I asked Waldstein's *opinion* of OS/2 as a multimedia platform. I mean, it's a multithreaded, true multitasking OS with a robust memory model (linear, not chunky like DOS). Isn't that a multimedia developer's dream? So shouldn't his company love it? What gives?

"OS/2's multitasking capabilities are interesting," he answers, almost apologetically. "Right now, though, it hasn't made the foothold it has to make in the market."

And there you have it. Regardless of technology, it's the *market* that drives a platform. Even if its engine has the soul of a 1994 Mustang, at the moment OS/2 has all the marketing punch of a 1992 Chevrolet Caprice.

Waldstein shifts in his chair and delivers the kicker. "We've created OS/2 drivers for all of our products and technologies...," he says, trailing off. Here it comes: "... but I would not buy stock in companies whose business plan is to blow doors on Windows with some killer OS/2 application."

It's a Windows Market

Let's start with some bald acknowledgments: Windows owns the current multimedia market. The Mac can take credit for making the vision of the market possible, but Windows is now driving it. More than two million CD-ROM drives have been sold into the Windows market, and companies like Creative Labs and Media Vision are doing quite well transforming plain vanilla PCs into multimedia-savvy boxes. Meanwhile, every software company worth its salt is bedding down with Hollywood types in a mad frenzy to create software that takes advantage of the upgraded machines.

But while games and simulations, encyclopedias and expanded books may be driving today's multimedia market the other shoe has yet to drop. When the corporate world finally weighs in with wholesale support for multimedia, as it did in the early '80s for 1-

Building Blocks: Multimedia Apps for OS/2

Application	*Category*	*Developer*	*Price*
Clipper	Video	Jasmine (818) 780-3344	$135
Color Tools	Graphics	Time Arts (707) 576-7722	$249
DisplayMaster	Presentation	Commix SP (703) 356-9858	$49.95
IconAuthor	Authoring	AimTech (603) 883-0220	$4,995
MEDIAscript OS/2	Authoring	IBM (800) 887-7771	$849 (desktop) $3,795 (professional)
MultiMaster	Authoring	Commix SP (703) 356-9858	$199
Person to Person/2	Videoconferencing	IBM (800) 887-7771	$280
Splice	Video	Digital Media (717) 286-6068	$295
Ultimedia Builder/2	Authoring	IBM (800) 887-7771	$239
Ultimedia Perfect Image/2	Graphics	IBM (800) 887-7771	$120
Ultimedia Workplace/2	Multimedia Database	IBM (800) 887-7771	$239

Glossary

AUDIO PRODUCTS: allow you to record, edit, and playback sound on your computer.

AUTHORING PRODUCTS: let you create multimedia applications and titles.

GRAPHICS PRODUCTS: allow you to create, manipulate, and display graphics on your computer.

MULTIMEDIA DATABASE SOFTWARE: handles media types—audio, video, text, graphics—as distinct database records ready for retrieval and use by other programs.

PRESENTATION SOFTWARE: allows you to incorporate graphics, text, and often audio and video into high-quality presentation displays.

VIDEO PRODUCTS: allow you to record, edit, and playback video on your computer.

VIDEOCONFERENCING SOFTWARE: when combined with the proper hardware, lets you conduct video-mediated meetings.

2-3 and WordPerfect, that's when the market gets *really* big.

As it does, the platform of choice in corporate America is likely to become a serious contender for the platform of multimedia choice. And with an estimated 1.5 million corporate desktops, OS/2 is gaining serious ground in the business world.

In a Perfect World...

It would be foolish to claim, given the universe of desktop platforms, that multimedia developers prefer to create applications for the Windows environment. They don't and it doesn't take very many interviews to get that message. One developer recently put it this way: "Making multimedia work under Windows is like training a gorilla to serve tea. You can do it, but a lot of things get broken along the way." And, of course, when you're done, you still have an ape serving your tea.

In the more diplomatic words of Elton Sherwin, manager of speech recognition strategy for IBM's PC-based voice recognition products, "Windows is a challenge for us."

"Windows is pretty much a horrible platform for multimedia," said Rick Doherty, director of the Envisioneering Group, a design verification and market research consultancy in Seaford, New York. "As more and more power multimedia developers find that 'Boy, I really want to merge these two sound clips,' or 'I really want to do a voice-over while viewing the video on screen,' they are finding out that Windows doesn't cut it, the Mac is OK, but OS/2 really works."

What's really important when it comes to multimedia-friendly desktop operating systems? For developers, the key is market share. Multimedia is expensive to develop. And, while the market is growing enormously, it's still immature, with far more flops than hits. There are millions of Windows machines out there with CD-ROM drives. There are at least a million similarly equipped Macintoshes. How many OS/2 machines have CD-ROM drives? Well, perhaps conscious of how that figure might look in print, IBM doesn't really care to hazard a guess. And as many developers and analysts have pointed out, so far there is not a single entertainment-related OS/2 CD-ROM title available.

Market share is also the likely answer for end-users concerned with a choice of shrink-wrapped software offerings, or with being able to play the latest game as soon as possible.

But what if your market is not a college student or an action game devotee but a department within a large business? Your concern is not market share, it's technology. And in that respect, OS/2 has a lot of things going for it.

Regardless of the current state of the market, there are multimedia developers who have decided to go with OS/2 as a platform of choice. After all, IBM threw big development bucks into version 2.1, and the new OS/2 Ultimedia tool set is a big hit with the developers who have checked it out (IBM's Video In for OS/2 won a best of show award at Winter Comdex). And with multimedia growing as a whole, the OS/2 market will get bigger too. Moreover, the corporate environment, where OS/2 has seen its greatest acceptance, seems finally ready to accept multimedia as a productivity-enhancing win.

"People are resistant to change, particularly people in corporations," says Jon Peddie, president of Jon Peddie Associates in Sausalito, California. "But the basic machine in the corporate world—386 or 486, lots of RAM and storage—is finally multimedia-ready."

Besides, good technology usually shakes out as a winner, right? The folks at Commix SP Inc. think so. Their MultiMaster for OS/2, a $199 multimedia database product, is one of those Very Necessary Products that you quickly become convinced you couldn't have lived without—a sort of 1-2-3 for multimedia. It allows you to organize sounds, images, and video clips into seamless presentations—you can even create run-time multimedia applications with it. Its point-and-click graphical interface is about as far from DOS as you can get—and for now, it's available only for OS/2.

"OS/2 Can Do It All"

"OS/2 is the trailbreaker for us," said Stephen Giordano, president of Commix. "Because of its multithreading capabilities, it could update multiple databases simultaneously. From a user perspective, I need this to do the reading, display, and compression on the fly. [Apple's] System 7 can do some of this, but not all of it. The most constrictive, of course, is Windows. OS/2 can do it all."

One of Commix's first clients was the commercial real estate arm of Washington, D.C.-based First American Bank. Using MultiMaster, First American created a program that organizes all the information about its commercial properties—financials, video clips, leases, photographs, even interviews with building managers where it's appropriate—onto a CD-ROM disk that then can be sent to perspective buyers.

"What used to happen is that you would end up negotiating with someone to sell the property, and your secretary would spend three days Xeroxing all this stuff, sending it to them, and then if they didn't like the deal they would *maybe* send it back to you,"

said Bruce Lyons, a bank vice president. "When it's on a CD-ROM, you can send all the information, including the financials with the programs to run them, and the disk costs almost nothing to duplicate. This is a great way to take a proposition and do a complete information package."

And the bottom line? The time, mailing, and administrative support savings alone more than pay for the investment in the MultiMaster system, Lyons asserts. And no one can put a price on the "sizzle" of offering due diligence on CD-ROM.

But Commix isn't dumb. It's developing Windows and Macintosh versions of MultiMaster, even if doing so means shoehorning its algorithms into constrictive environments. Regardless of the bias inherent to working for IBM, Elton Sherwin finds himself forced to do the same. "When we released the Personal Dictation System, it was only on OS/2," he said, "but most of the home market is still DOS-Windows."

The Missing Pieces

Even if OS/2 *is* the best development environment, Commix's Giordano did find some problems along the way. Chief among them was OS/2's anemic support for de facto multimedia standards like Apple's Quicktime, Video for Windows, and Kodak's PhotoCD. "OS/2 is lacking in some multimedia tools and we have had to write them for ourselves," he said. "Users should not have to delineate between multimedia file formats in applications."

True photorealistic color also is missing in action for OS/2, according to Peddie. Presently, there are very few true-color drivers available for OS/2, so unless you happen to own the right video board and monitor, you're out of luck. "It's primarily the board and chip makers' responsibility [to create drivers that support third-party standards], but IBM has to make them feel it's worth the effort," Peddie said.

But market pioneers like Commix may yet make hay as the sun shines more brightly on OS/2. As Apple did when it was forging the multimedia market three years ago, IBM, or other major players soon to enter the OS/2 market (Adobe's top-selling Premiere video product will be ported shortly from Macintosh and Windows), may just decide to license already existing third-party drivers instead of reinventing the wheel. After all, if Commix creates QuickTime, PhotoCD, and Video for Windows drivers that work well under OS/2, why shouldn't IBM incorporate them into future releases of its system software?

Regardless of its missing pieces and lack of market share, IBM thinks it has what ultimately will turn into a winner in the interactive age. "We now have a platform that developers can be productive on," said Mary Snedden, marketing program manager for IBM's Ultimedia tools. "There is a significant lag in tools and products" for the OS/2 environment, she admits, but she attributes that to developers wary of the old chicken-and-egg question of market share: you're not going to see great tools on a platform with few users. Conversely, users aren't going to flock to a platform with few great tools.

IBM has attempted to counter that with a number of tools of its own: Ultimedia Builder (an authoring tool), LAN Server Ultimedia, Ultimedia Manager (a design tool), Ultimedia Perfect Image (a graphics tools), and Ultimedia Video, among others. In fact, of the 15 or so offerings for OS/2 multimedia in IBM's multimedia catalog, seven are IBM's own.

Now that OS/2 is stable and basic tools are available, IBM expects to see the OS/2 multimedia market take off, Snedden said. "As developers look at their choice of platforms, I think many of them were skeptical, waiting to see what OS/2 2.1 was really like," Snedden said. "Now we're starting to see titles using the product." Additionally, Snedden said, "People who are building (multimedia) tools in Windows are now looking at OS/2."

"Windows' inherent inability to do [multimedia] is making developers realize that OS/2 is where the market is going," concurs Envisioneering's Doherty. And why might developers be looking? Probably because they have seen indications that the future is not the home hobbyist or PowerBook-toting producer. "The real numbers are in corporate America," asserts Snedden. "They stand to gain the most from the productivity gain of multimedia." Witness First American Bank: The profit-driven enterprise is clearly where multimedia growth will happen in the 1990s, and that's where OS/2 has its strongest allegiances.

That may be, but IBM still has one hell of a marketing job to do if it is to overcome the perception of most of the multimedia developers I spoke to for this article. Asked if his company would ever develop for OS/2, one highly respected product manager, who like most preferred to remain anonymous to avoid impacts on any future business with IBM, looked me dead in the eye and proclaimed: "OS/2 is a dead platform. Period."

"IBM lost the cutting edge of the multimedia market back in 1991 when they committed to the Laserdisc platform," commented another high-profile multimedia developer, referring to IBM's effort three years ago to establish itself in the multimedia

marketplace. "It has a lot of evangelism and marketing to do to get back into the game."

So what is IBM doing to counter these gloomy predictions? Big Blue still has a ways to go before it garners a Nimble Marketer of the Year award, but it has come a long way in coordinating and communicating among its 300,000 employees worldwide.

Not yet far enough, though. "A lot of developers don't know where to go to get support from IBM," Doherty said. "[At one time] they went to Atlanta, then Boca Raton, maybe Austin, and now Mountain View."

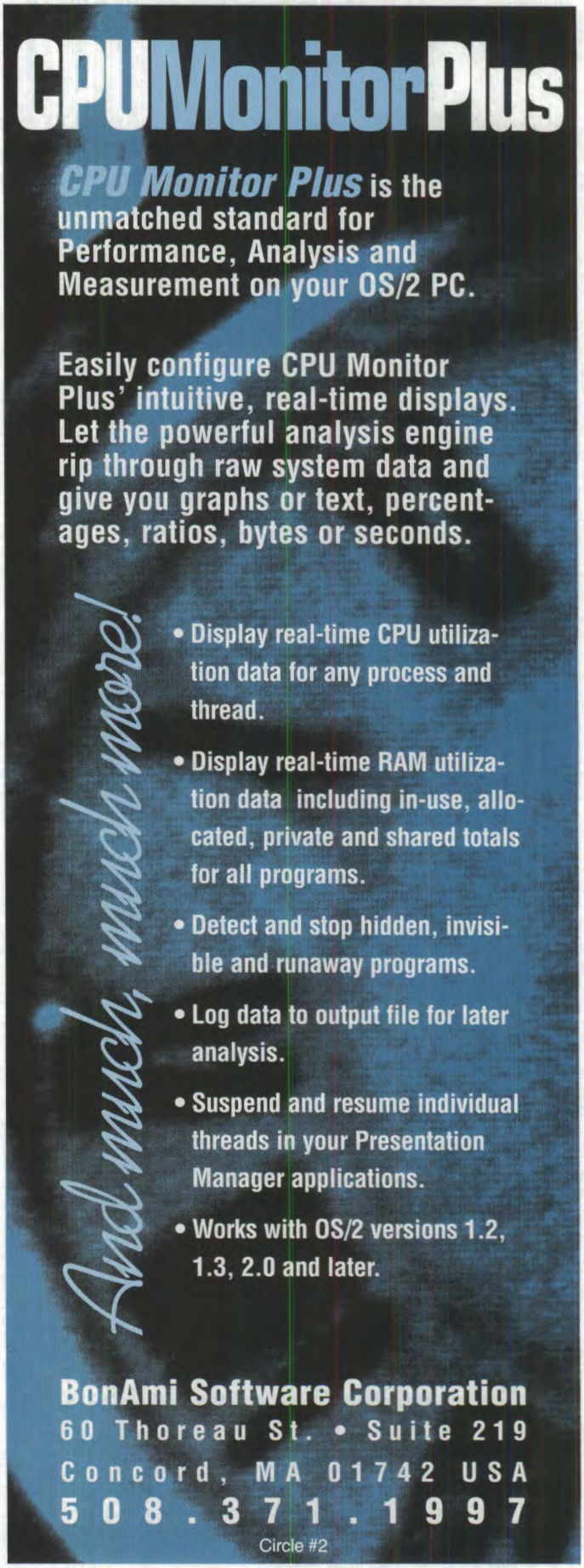
IBM has answered the disorganization question by centralizing its multimedia support under one location and phone number (800-887-7771). Its marketing efforts, however, still leave much to be desired. At present, IBM has no coordinated marketing plan to push OS/2 as the multimedia platform of the future, and with the company's entire strategy under review by a downsizing-minded CEO, that's not likely to change anytime soon.

"I'd like to say we had a full-court press ready to hit," said Karl LaWall, multimedia brand manager for IBM. "But that is not the case."

LaWall said he hopes the entry of major players like Adobe into the OS/2 world will speed developers', and eventually end-users', appreciation of OS/2's multimedia muscle. "We hope to provide the kind of tools that may entice developers to come over."

True, that doesn't sound very aggressive, but as OS/2 closes in on an installed base of five million, with most of those installs occurring in the corporate enterprise, OS/2 could succeed as a multimedia platform despite its parent's fumbling efforts. As Creative's Arnold Waldstein put it when our meeting was over and he returned to the business of selling multimedia to a Windows-dominated world: "We are seeding the future, and OS/2 is one of those seeds." ◆

John Battelle has been covering technology from the San Francisco Bay area for close to a decade.



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tating this article, for example, corrections were rare.

IPDS takes a little getting used to. When you type, your thought processes tend to revolve around the act of typing rather than the shaping of the text. Ironically, in the days of typewriters and stenographers, far more people were used to thinking in the terms IPDS requires. Luckily, the transition in your writing process isn't likely to be difficult or to take very long.

Separate Your Words

While it would be nice for IPDS to accept continuous speech, learning to speak in separate words really isn't particularly difficult. Actually, we found that we had to remember to return to normal speech after dictating, much to the annoyance of those around us. IPDS is fast enough that you can actually speak quite quickly—faster than you might in normal conversation in some cases —as long as you remember to separate your words.

For people who don't type, for those who must dictate while their hands are engaged, or for those who must dictate over the phone, IPDS is a breakthrough. In addition, there are obvious uses for people who are physically challenged. Even for skilled typists, this product can improve productivity, since dictation with IPDS can be two or three times faster than most typists can key in.

The IBM Personal Dictation System is the "voice typewriter" that was the stuff of science fiction writers—until now. The product does nearly everything that the world of SF predicted it would, does it well, and does it quickly. It's not stretching things too much to suggest that this product will make virtually everyone who must turn thoughts into words more productive. ◆

IBM PERSONAL DICTATION SYSTEM

IBM Corporation—Power Personal Systems
Route 100, Somers, NY 10589
1-800-TALK-2-ME
List Price: $499 Adapter: $499 (ISA) $579 (MCA)
(Adapter includes a headset microphone)

OPERATING REQUIREMENTS

PROCESSOR: 486SX, 25mhz minimum; 486DX, 33mhz recommended. IBM Personal Dictation Adapter (ISA bus) or IBM Personal Dictation Adapter/A (MicroChannel bus).

MEMORY (RAM): 8mb above OS/2 and other apps.

HARD DISK (DASD): 32mb available disk space (additional 30mb needed during the enrollment process). Additional specialty vocabulary requires additional 13-17mb DASD.

MICROPHONE: included, loudspeaker (optional) and compatible cables.

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continued from page 13

Cold tea, hot design

After spending nearly the entire day hunched over the computer, working on taxes and tweaking OS/2, I decided to give the old body a break. I fixed a piping cup of tea, put some relaxing music on, and grabbed the January issue of *OS/2 Professional*.

Then I reached page 85 and saw this completely unsubstantiated personal attack on the graphic quality (or alleged lack thereof) of your excellent magazine. Some undeservedly arrogant person named Michael Wagner, who never once hints at a specific constructive idea or even remotely lets us know why you should, asks you to please take his advice and seek better art direction.

Mr. Wagner, obviously you motivated me to reboot after a long day. And, although I had just previously been thinking quite the opposite of your opinion as to the magazine's aesthetics, I decided to go back over it with a critical eye, to see if I could detect what it is that got your knickers in such a twist. I couldn't.

What I did see is that because of where OS/2 is today, most of the advertisements are from smaller, independent developers, not the deep-pocket moguls with enormous advertising budgets. And the quality of their ads, naturally, reflects that. If that's what bothers you, it's a problem of economics, not of talent. Besides, I imagine most of those ads are prepared elsewhere and furnished as camera-ready art.

The instant availability of desktop publishing and a plethora of typefaces and graphic contrivances have prompted too many people to put aside their boxes of crayons to become layout "experts." The resultant hodgepodge is what I've always known to be called "circus" layout, and it has crept into too many computer magazines.

Therefore, I thank Elizabeth Black et. al., for effectively using tried and true layout techniques instead of simply playing with the graphics toys computing has made available to them.

Now, I feel better, but my tea is probably cold. ◆

John P. Jones
DeFuniak Springs, Florida

Thanks

I enjoyed Tony Pereira's "Getting Started in OS/2 REXX" [Code Cache, December]. I've heard good things about REXX but the OS/2 2.1 docs weren't much help getting me started. Tony's article really helped. Keep 'em coming. ◆

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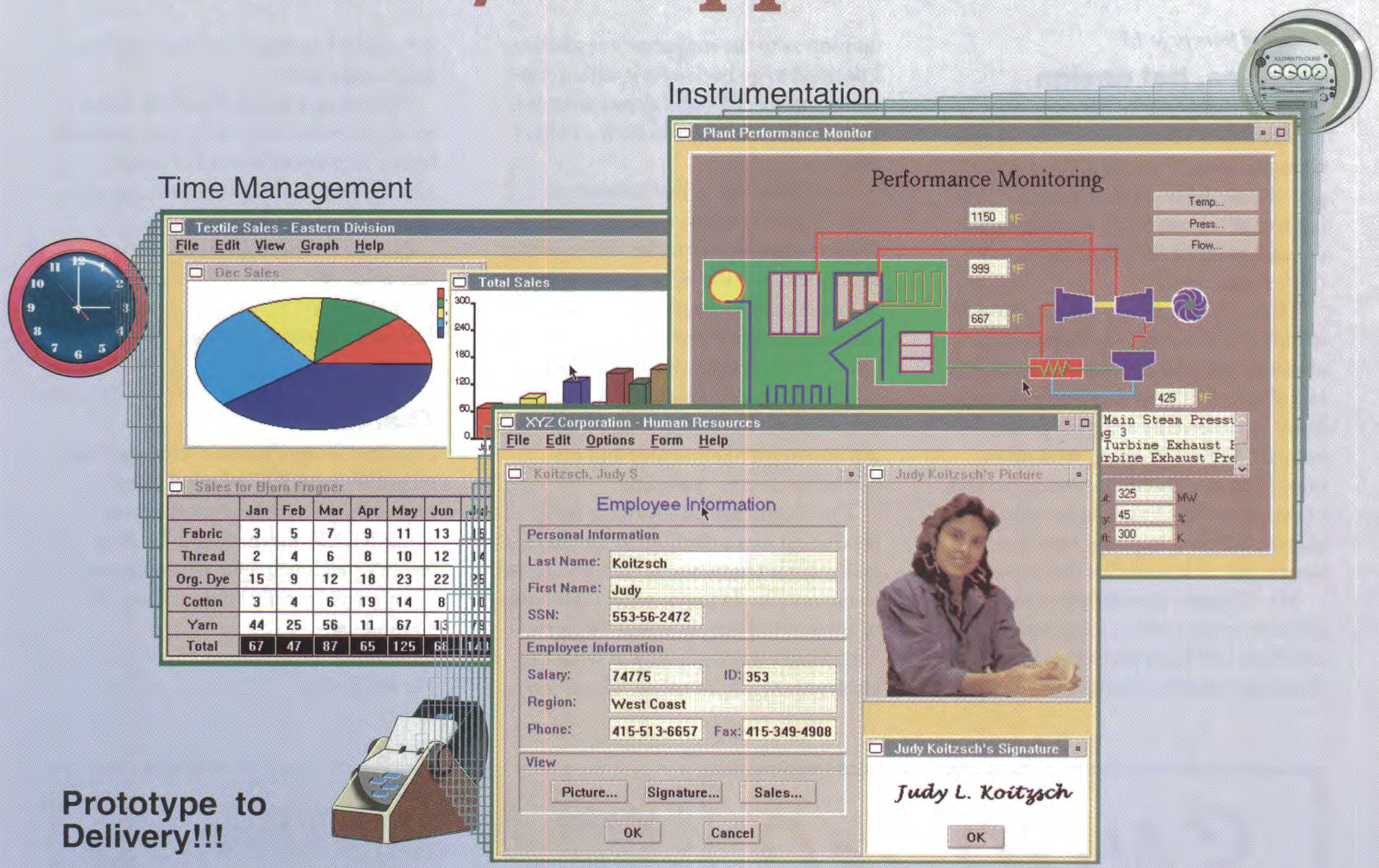
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EYE ON THE MARKET

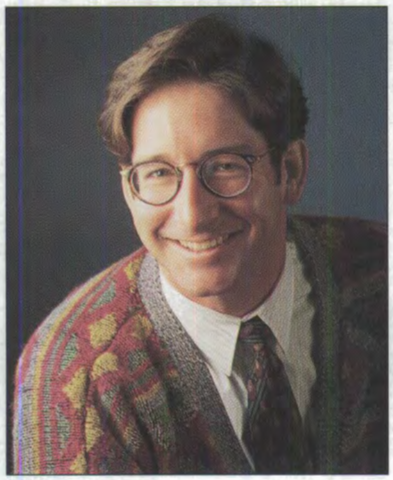
Compounding the Document Dilemma

If one cross-application document model is good, are two better?

BY MICHAEL S. KOGAN

OpenDoc is on its way to OS/2—and Windows, Unix, and the Macintosh too.

In today's user-centric systems, differing file formats and applications for each user task make integration difficult, especially when trying to share data. The document-centric model, in the form of the OpenDoc technology and Microsoft's OLE 2, overcomes these limitations by moving away from the user as the model for the desktop. Instead, it places at the center of the computing environment a new construct, the *compound document*. Compound documents are application-based files in which users can embed data from different applications, like spreadsheets, graphics, text, sound, and video.



OpenDoc is a cross-platform object-oriented architecture. As its name implies, it is also an open architecture. It is backed by the Component Integration Laboratories (CIL) consortium—an outgrowth of individual developers' efforts to develop compound documents, scripting and automation interfaces, and object standards. With membership led by IBM, Apple, and WordPerfect, CIL is well-positioned to establish standards for key technologies that integrate information and media from many applications in distributed environments.

IBM is implementing OpenDoc on OS/2 and AIX, and anticipates a beta program this summer. The Apple implementation of OpenDoc on System 7 for the Macintosh is currently in beta test, with shipment expected in the second half of 1994. WordPerfect is implementing OpenDoc on the 16-bit and 32-bit Windows platforms, with beta-testing expected during the summer.

OpenDoc Architecture

Although OpenDoc is object-oriented, it is not an object framework. It doesn't necessarily make it as easy as possible to manage compound documents; it simply makes it possible to get the job done. Its component-based design plugs procedural code into an object-oriented architecture, allowing ISVs to retrofit existing code easily.

The OpenDoc architecture consists of:

- the OpenDoc API;
- an Open Scripting Architecture (OSA);
- the Bento compound document format; and
- an Object Management Group (OMG) Common Object Request Broker Architecture (CORBA) distributed object model.

OpenDoc-based software comes in two varieties: compound document viewers and editors, and part handlers. Viewers and editors allow users to manipulate and format parts within a compound document container. Part handlers are dynamically activated by viewers and editors to manage the content of part objects within a document—for example text, spreadsheets, graphics, and video parts.

Scripting with OSA enables users and OpenDoc part handlers to collaborate on the management and automation of compound documents. Bento allows OpenDoc containers to be stored on a variety of media, such as memory, the clipboard, or files. It supports concurrent access to the parts stored within a container using multiple i/o streams.

SOM Confusion

OpenDoc for OS/2 and Windows will use IBM's System Object Model (SOM) to manage OpenDoc objects, but it is not clear what will be used for objects in the Apple version. The current OpenDoc implementation for the Macintosh uses a C++-based object model from the original OpenDoc work at Apple. Apple clearly needs something like SOM for language- and platform-independence, and the ability to distribute objects in a CORBA-compliant manner.

There also has been some confusion about which SOM is part of OpenDoc and whether or not it meets the requirements of CIL.

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EYE ON THE MARKET

The first release of SOM, shipped with OS/2 2.0 and 2.1, does not: SOM 1.0 supports neither multiple inheritance nor CORBA-compliant object distribution, primarily because the CORBA 1.1 specification was not completed before OS/2 shipped. However, the latest release of SOM, SOMObjects, provides these key features and more for OS/2, Windows, and AIX platforms. Look for IBM to upgrade OS/2's SOM support in OS/2 2.2, and also to continue making the latest SOM support available in the toolkit product format.

War of the Objects

With CORBA in place, the OMG has now created a task force to address compound document standards, with the focus on OpenDoc and OLE as the two leading technologies. Although object partisans will argue the merits of each architecture, they do share similar goals and features. They are both cross-platform object-oriented architectures for compound documents that require a significant programming effort, comparable to that of moving to a GUI-based environment.

Neither, however, is the fully developed object-oriented envi-

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ronment that Cairo and Taligent are supposed to be. OLE 2.0 and OpenDoc provide an evolutionary step rather than a revolutionary one. They allow developers to leverage their existing GUI software into a component-based architecture that supports compound documents and collaborative object services.

The main differences between OpenDoc and OLE are market-based. OLE applications are already rolling out, tools are in place, and OLE is backed by Microsoft's excellent marketing and developer relations. OpenDoc is nowhere near as far along. Early versions of OpenDoc are getting into developers' hands now and tools should become available later in 1994, with applications rolling out in 1995. Apple, WordPerfect, and IBM will lead the CIL effort to move OpenDoc into the Macintosh, Windows, and OS/2 markets respectively.

To address customers' concerns that the two technologies may divide the market, WordPerfect is implementing OLE 2.0-OpenDoc interoperability. Although the goal is to allow native OpenDoc and OLE 2.0 programs to share objects and collaborate on compound documents, there is some question as to how complete and seamless the support will be.

Outlook

Regardless of the outcome of the OpenDoc/OLE battles, OpenDoc promises OS/2 developers and users better application integration and an object-oriented architecture for delivering information across the enterprise.

Although the content of the object battle is new, the dynamics are familiar. On one side we have OpenDoc, a formally open standard backed by a consortium of major players; and, on the other side OLE, a de facto proprietary standard defined and controlled by the industry giant, Microsoft. Perhaps the most critical consideration in favor of OpenDoc is that it *is* open, while OLE is proprietary to Microsoft. It is a fact of life that many developers fear having their application strategies and markets controlled by Microsoft, no matter how lucrative.

Market share for OLE and OpenDoc will be determined by the decisions of the ISVs, and interoperability probably won't figure significantly as a factor in making either architecture more attractive. In fact, both OpenDoc and OLE supporters see interoperability as a justification for sticking with their architecture, and as a promise to their customers to deliver the best of both worlds.

Like OS/2, OpenDoc's survival is a given. The question that remains is whether or not OpenDoc is destined for a significant place on the desktops of corporate America. ◆

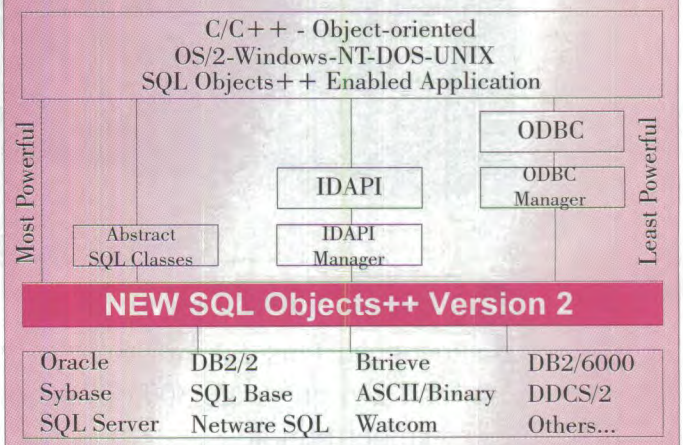
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HANDS ON

The Current State of OS/2 Word Processing

In which we muse whether a good app should take precedence over a good environment.

BY BRADLEY D. KLIEWER AND ALAN S. KAY

If you're still confused about OS/2 word processing options, you're not alone. As we at *OS/2 Professional* consider which application we want to standardize on (currently we still use the DOS/OS/2 text-based version of Microsoft Word 5.0), the internal debate rages on.

For the remaining few, the still proud, the command-line mavens, the overhead and awkwardness of any GUI-based word processor can be nearly intolerable. To them, the speed and elegance of a few NCD (Norton Change Directory) commands coupled with a command-line call to a word processor and document file (e.g., NCD JANDOCS followed by WORD JANMEMO) conveys a feel of efficiency that is difficult to find with the new offerings.

Yet DOS-based word processing is a dead-end street. All new development efforts center on GUI technology. If we want features such as multiple document recall, improved automatic backup and recovery, multi-level undo, and simplified printer driver support, we must move beyond the shackles of command-line DOS.

On the surface, the answer seems clear. Move to OS/2 and unleash the full power of 32-bit computing on our desktops. Unfortunately, theory and practice do no always mesh. All new development efforts must navigate some rough waters (optimizing to a new environment, bugs in new code, etc.), and 32-bit applications are just now beginning to get their sea legs. Sadly, some efforts (such as WordPerfect for OS/2) barely make it out of port before sinking in the storm.

Windows word processors tend to include better features, better integration, and more stability than their OS/2 counterparts. Yet if most of your work involves DOS- or OS/2-based programs, the overhead of loading Windows for one application becomes tiresome. At *OS/2 Professional* most of our core applications still require a DOS or OS/2 environment. Every time we load a word processor (by far the most heavily used application) that is Windows-based, we end up waiting much longer to get to work than we do with Word for DOS.

With plenty of Windows word processing options to choose from, our current favorite is Microsoft Word 6.0. Winword has a certain "fit and finish" that we don't find in the other entries: an attractive (and functional) screen layout, automatic text modification (such as letter transpositions and positioning open and close quotes), and speed. Word 6.0 works the way we do. Although our heritage in Word for DOS may account for some of this familiarity, the differences between Word for DOS and Word for Windows are substantial—which brings us to some of the disadvantages of Microsoft Word. Word document formats seem to change with the seasons. In an environment such as ours, where documents move among several different versions of Word and two platforms (PC and Macintosh), the plethora of file formats within a single product line becomes annoying.

Among the OS/2 word processors, DeScribe is a top contender. It's lean and mean. DeScribe consumes a modest 1.5mb to 3.5mb of RAM, loads documents nearly twice as fast as Microsoft Word and Ami Pro, and has a few slick features of its own (the spelling checker includes optimizations that improve performance for minor document edits). However, DeScribe simply doesn't "feel" as comfortable as Microsoft Word. The draft mode is a little too "drafty," the overall structure of the WYSIWYG screen doesn't seem as sharp as the big guns, and it implements some features in slightly off-standard ways (such as requiring an extra menu step to recall recently used files).

Until it dropped out of the native OS/2 arena, WordPerfect had the best integration with the Workplace Shell. Its drag-and-drop implementations and automatic document tagging and recognition within folders was a sight to behold. WordPerfect is also the champion of cross-platform computing with versions for OS/2, DOS, Windows, Macintosh, Unix, and VAX/VMS. But the initial release was buggy and slow. And WordPerfect dropped plans to develop a native OS/2 version of 6.0.

That leaves Ami Pro for OS/2. Like WordPerfect before it, the initial release leaves something to be desired (see the accompanying review). We thought WordPerfect for OS/2 was too slow, and AmiPro is slower yet.

However, Lotus responded rapidly with fixes that should be available by the time you read this. Ami Pro also has an interface that feels much more comfortable to our ever-demanding needs (though still not as polished as Word 6.0 for Windows). Ami Pro has an additional advantage—it is one of a suite of native OS/2 applications. Although Freelance and Lotus 1-2-3 are also very resource-intensive, development continues and we expect to see new versions shortly. The remaining Suite application, cc:Mail, is a pleasure to use and well-integrated with OS/2's Workplace Shell. Most importantly, all four applications were meant to be used together.

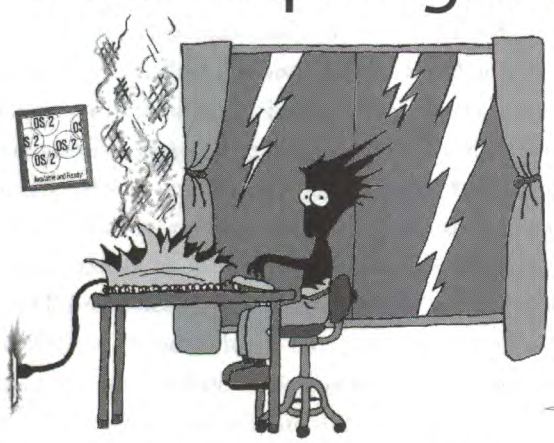
As of this writing, we are trying Ami Pro for Windows as a possible transition point into a matured future version of Ami Pro for OS/2. We still prefer using Microsoft Word, though, and this raises the question we often hear from readers: "Why buy a native OS/2 application when DOS and Windows run so well under OS/2?"

We don't have a short or simple answer to that. We're not talking about games here, but rather tools to get specific jobs done. And there's a substantial premium placed these days on efficiency and productivity. We understand no better than anyone else why one would choose a less efficient or comfortable tool for the sake of an abstract commitment.

Certainly there also are plenty of disadvantages to using emerging technology. However, there are advantages as well: faster load times (not a factor when several Windows applications are running simultaneously), long filenames (*much* better than the tired old 8.3 format), and better integration with the Workplace Shell.

The jury's still out. The advantages of OS/2 are *almost* enough to make us forsake what we consider a better overall product to work in a better overall environment. In the meantime, we are patiently awaiting the revisions to Ami Pro for OS/2—it may just be enough to finally tip our hand toward native 32-bit computing. ◆

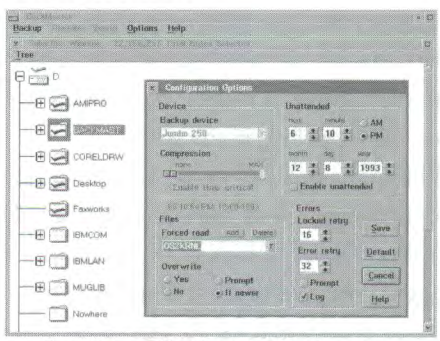
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Circle #33



Ami Pro: A Need for Speed

Lotus's determination to compete in the OS/2 word processor sweepstakes is cause for celebration. But its current entry, though flashy, isn't likely to win any races.

REVIEWED BY RICH MALLOY

When WordPerfect dropped out of the OS/2 word processor market, columnist John Dvorak took an enlightened view of what might otherwise be considered a tragedy. He wondered if anyone really needs a word processor that can take advantage of the fancy features in OS/2.

"What OS/2 needs," he noted, "is an OS/2-only application that is a so-called killer app—something everyone wants. It doesn't need WordPerfect 6.0 with two extra features."

That's a valid point. But part of me still believes that a powerful word processor that is fully OS/2-compatible would be a valuable resource in the OS/2 arsenal.

So it was with great anticipation that we awaited Lotus's Ami Pro release 3.0 for OS/2. The new Windows version of this product had just won a handful of awards, outclassing the dreadnoughts WordPerfect and Microsoft Word. Not only would the OS/2 version have similar features, it would also be able to take full advantage of the power and speed of OS/2 2.x—a full 32-bit operating system.

Well, Ami Pro release 3.0 for OS/2 has a ton of good features, but speed is not one of them. Ami Pro users can set up tables, multiple columns, outlines, picture and text frames, macros, and mathematical equations. Do not expect to break any speed records while doing so, however.

Quickness-Challenged

Why is Ami Pro slow? (Or should we say quickness-challenged?) We tested it on a fairly fast machine, a Gateway 486DX2 at 66mhz with local bus video and 8mb of memory. Lotus says that Ami Pro requires a 386 processor with at least 8mb, so the Gateway is more than sufficient in the processor category but at the lower limit for memory—and that's a dangerous place to be as far as OS/2 is concerned. We also ran tests on an IBM PS/2 Model 80 at 20mhz with XGA video and 28mb of memory and found better performance in some categories (and worse in others, particularly keyboard input).

Exactly how slow is this app? Quantitative tests do not tell the complete story. On a text scrolling test involving a 100,000-character file, Ami Pro was just 4 percent slower than Microsoft Word under WIN-OS/2. But large-scale repetitive actions are not representative of how we use word processors. In most tasks we have to execute a large number of different actions. And in Ami Pro, almost every action seems to require substantial resources.

Translation: On an 8mb system with only Ami Pro loaded, virtually every task requires time-consuming disk access. For example, press Alt-F to get the File menu, you hear a disk access as it gets the menu choices. Press N to open a new file and there is a long disk swap as it loads the various templates (or style sheets, as Lotus calls them), a new disk access for each.

As for typing, it can keep up with you on a 486 (and lags up to one word behind on a 386), but it takes a short cut. If you're typing really fast, the program will stop updating the screen after each keystroke the way it normally does. Instead, it gathers the keystrokes in a buffer and pops groups of characters onto the screen in bursts. Stop typing and the software has caught up to you in an instant.

The biggest problem with Ami Pro's approach here involves the Backspace key. Hold down the Backspace key and you'll see one character deleted. But that's not all that's happening. Unless you're exceedingly light on your fingers, Ami Pro is actually storing up a number of Backspace codes. Lift up the key, wait a moment, and suddenly a half-line of text will disappear. You quickly learn to make large deletions by highlighting them first.

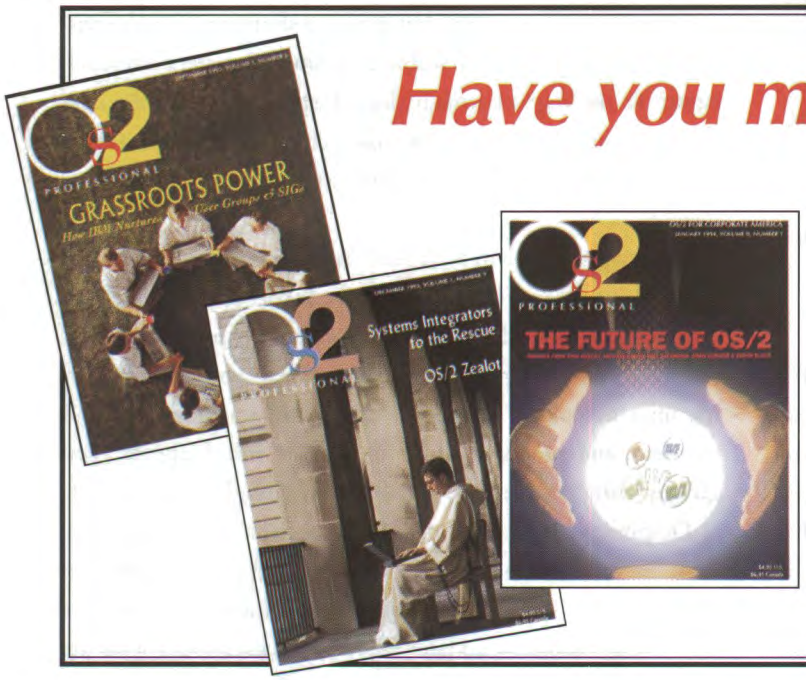
Despite the speed and resource problems we encountered, Ami Pro's future appears to be brightening. As we were going to press with this issue of *OS/2 Professional* Lotus shipped us a beta copy of a forthcoming update—the new release should be on the

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shelves by the time you read this. The shipping version we tested consumed a staggering 6mb of free RAM and crept upwards toward 7.5mb while in use (leading to extensive swapping in an 8mb system). The beta lowered initial RAM requirements to a more reasonable 3.5mb and crept up to 4.5mb over time. The beta also runs faster, though still not the fastest we have used (in the OS/2 realm those honors rest with DeScribe).

OS/2 Features

Ami Pro has every feature you would expect or might need in a top-rated word processor. You can build a table that looks almost as if it were created by a spreadsheet. Wanna-be publishers can create impressive newsletter formats with headlines spanning multiple columns and text flowing around graphic images. When organizing your work, you can build an outline and then telescope various sections of it. After creating a document, you can check it with the now obligatory thesaurus and spelling and grammar checkers.

For more complex documents, where management and tracking are important, Ami Pro will automatically keep track of revisions or combine several documents into a single master document. For the mathematically inclined there is an equation editor. And there is even something that might normally be considered an oxymoron: an easy-to-use mail-merge feature.

Instead of simply porting the Windows program, Lotus has made an effort to incorporate specific OS/2 features. As you would expect, Ami Pro for OS/2 is compatible with the Workplace Shell. Drop a document icon onto the Ami Pro icon and you'll soon be editing that document. To start a new document, you can "tear" a new document icon off the document template icon. And to do things such as modify a text style or specify user preferences, you use the familiar OS/2 notebook paradigm.

Using DDE (Dynamic Data Exchange), which allows two programs to exchange data, Ami Pro can communicate with its sister OS/2 programs from Lotus, or any other DDE-enabled program. For example, you can use DDE to link a 1-2-3 spreadsheet table into an Ami Pro document. When the spreadsheet changes, so does the document.

One potentially quite valuable feature of Ami Pro is its support of REXX, OS/2's macro language. Ami Pro macros can contain REXX commands and vice versa. When combined with DDE, this macro capability could be very useful for vertical applications. Unfortunately, the need for speed was not the only problem we had with Ami Pro. In the area of graphics, Ami Pro has a very nice frame feature. You can set up a frame and easily modify it. You can even put text or a table into it. But I had a little trouble importing graphics into a frame. The program wouldn't read a Windows metafile image correctly. Parts of the image were dropped out inexplicably.

A Problem Saving

The worst bug a word processor program can have is the inability to save a document. And this bug stung me repeatedly when I tried to create a business letter using one of the templates (style sheets) that comes with the program. Every time I tried to save the new file, the program would bomb. Only when I cut out the graphic image that was in the style sheet was I able to save the new document safely. This may be a memory-related problem, but it should not be allowed to happen with any amount of memory. The beta version no longer bombs, but it still would not save the file while the graphic was imbedded (of course, this could change by shipment time).

Lotus Ami Pro 3.0 for OS/2

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Word Processing Division
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In summary, Lotus is deserving of praise for its commitment to OS/2. It also has to be congratulated for its noble intentions regarding Ami Pro for OS/2: combining all the award-winning features of the Windows version with the power conveyed by OS/2. But its execution of these lofty intentions needs some more work. Happily, if the beta is any indication, the work is progressing smoothly.

My advice: Wait for the update based on the current beta. Ami Pro is too good a program and Lotus is too smart a company to let a less-than-perfect implementation wallow on retail shelves for too long. The beta seems to portend a usable version, if still somewhat slow compared to the competition.

More importantly, Lotus has been responsive to problems introduced in the first release—no software is perfect and Lotus appears committed to the market. If yours is an open field of choices, you should also check out some of the other native OS/2 options: DeScribe (last reviewed in the November 1992 issue) or Footprint Works, a very capable, speedy, and inexpensive set of applications (reviewed in January 1994). ◆

Make a Quantum Leap

A new program helps you solve the most complex business problems.

REVIEWED BY RICH MALLOY

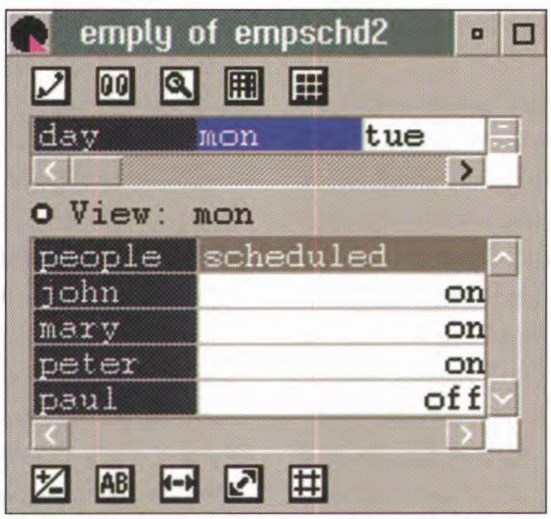
Here's a head-scratcher for you. You're in charge of a store that has to be staffed with three people each day, Monday through Sunday for the next two weeks. You have four staffers at your disposal. How should you set it up?

Not so hard, you say? Consider these restrictions: Company policy states that no person can work more than five days straight. During the two weeks, each person should have at least three days off, one of which should be on a weekend. And, where possible, at least two of the days off should be consecutive.

After 30 minutes of scribbling on paper, you realize the best way to handle this is on a computer. The big question is, how?

If you have two or three days to spare, you could write and debug a program that would solve it in BASIC or REXX. If you happen to know Prolog, you could write a program in a few hours. But if you have only an hour to spare, there's only one way to go.

What you need is a relatively new program named Quantum Leap from Quantum Development, a small firm in Wilmington, Delaware. According to the company, Quantum Leap is a next-generation business-modeling and problem-solving tool. According to me, it is a tool for solving what I call *reverse problems*: problems where you have a pretty good idea of the solution—you just don't know how to get there.



Like a spreadsheet, Quantum Leap requires you to organize your business model into tables. In the above table "emply" of the model "empschd2" the lower table shows the four objects of the class "people" and the single attribute "scheduled." The upper table shows a third dimension: the days of the week. Note that the data for Monday is selected.

In more formal terms, Quantum Leap is an object-oriented multidimensional spreadsheet with exceptional abilities to create models and optimize variables for certain objectives. It does not completely replace a spreadsheet, but it solves problems that would be almost impossible otherwise.

To illustrate, let's pick another example. You are manufacturing three different widgets, A, B, and C. The cost of manufacturing each widget decreases exponentially with quantity. Also, to sell the widgets you must advertise. From past experience you know that the ratio of widget sales to advertising dollars seems to increase linearly but then gradually approaches a maximum point at which your market is saturated and advertising is completely wasted. With a given advertising budget, how much should you advertise each widget for maximum profit?

To set up this model, you need two exponential equations, one to represent cost, and the other to represent sales as a function of advertising. Once you have those, you can plug them into a spreadsheet such as Quattro Pro for Windows and either try random what-if guesses or use Quattro Pro's Solver function. This is a quick and efficient solution—until the model gets more complicated.

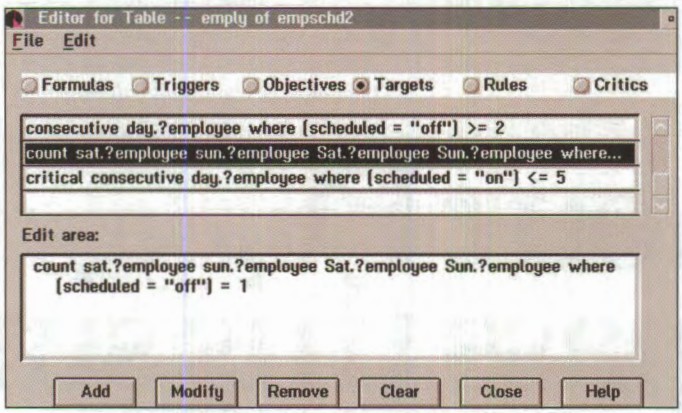
In real life, the cost of raw materials would not drop exponentially but by a series of steps as quantities increased. Also, at some point labor cost per widget will increase because of increased overtime. Perhaps the widgets are linked in the manufacturing process: for every widget A you also have to produce a widget B. In a spreadsheet we would need to write increasingly complex equations that would be increasingly prone to errors.

In Quantum Leap, by contrast, we could still set up a table as in a spreadsheet, but our formulas and restrictions would be much simpler than your average spreadsheet formula. The reason for the simplicity: QL's unique form of object orientation. To model something, you set up one or more tables of objects. Each table is really a class of objects (in this case, widgets). Each row of the

table represents one of the objects (A, B, or C). The columns represent attributes of the objects (e.g., quantity, cost, advertising, profit). In short, each table is a simple database of objects.

The tables can also be multidimensional. For example, if you have two factories producing the widgets, you can set up another dimension for the factory name.

Once you have laid out your model and entered the various constructs (formulas and restrictions), you tell QL to find a solution. It goes into action by translating your problem into a C program, which it compiles with an external C compiler and runs via OS/2's multitasking feature. As this C program is running in the background, QL keeps you informed of its progress, telling you how long the program has been running, how many scenarios of values have been tried, and how close it has come to meeting your various constraints and objectives. After a few minutes have gone by without getting any closer to your objectives, you can assume that QL has done about as well as it or anything else can do.



Quantum Leap lets you enter constraints (or targets) for your data in relatively simple ways. The highlighted target in the upper window is echoed in the edit area below it. This target uses a "count" function to ensure that each employee has one weekend day off during the two-week period. Here the question mark serves as a wild card meaning any employee.

In addition to its simplicity, the other advantage of QL over a standard spreadsheet approach is its adept handling of unusual relationships between data points. QL has, for example, functions for handling consecutive values within a set, a function that was used in the staffing example above. With enough effort, you could probably do something similar with a spreadsheet—but life is too short.

Despite its power, QL is not perfect. Its interface has all the obligatory GUI elements, but it is not nearly as slick as your average Windows spreadsheet. A number of program features are not intuitively obvious, including a slew of small mysterious icons. It takes some getting used to, plus some frequent consultations with a very helpful Quick Reference pamphlet.

Quantum Leap is also a bit of a memory hog, requiring a 486 with 16mb of RAM, though I ran it on a 486/66 in 8mb without problem. On disk, my standalone installation takes up 13mb.

The program exhibits at least one holdover from UNIX-land: The cost for Quantum Leap includes an annual fee (of up to $295) that covers the cost of telephone support and free updates and upgrades. Before you run the program, you have to call the company to register the program and get a registration code, which activates the program for a set period of time. This is an effective way to get 100 percent of the company's customers to register—and to make sure they pay the annual fee.

After calling for the registration number, I soon had to call them again. The product comes with 10 very interesting example models, including solutions for the famous traveling salesman problem and even an airline scheduling model. But I couldn't open any of these. Quantum's support people explained that a minor bug—since fixed—prevented the version I had from reading certain FAT files. They said they would send me a new version right away and gave me a quick work-around in the meantime.

With its Unix provenance, Quantum is obviously aimed at heavy duty networked installations. The company announced recently that it would be offering a version that supports both multiprocessing and distributed processing as soon as the symmetric multiprocessing version of OS/2 becomes available. Not to ignore standalone users, however, a Quantum spokesperson also told me that it expects to have a lower-priced standalone version (version 2.1, $694 with an annual fee of $195) available in March.

QL is not for everybody. But there's more of a chance than you may think that it is for you. This is an impressive and ambitious piece of software development work. It may be a bit expensive, but if you have a problem that requires Quantum Leap, it is well worth every penny. ◆

Quantum Leap for OS/2, Version 1.2

Quantum Development, Inc.
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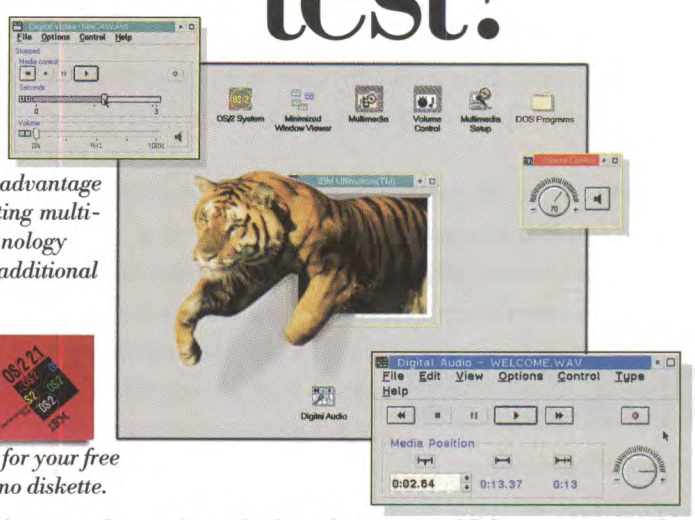


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TRYING TO MAKE CONNECTIONS

How do you communicate to and from SNA and NetBIOS systems? With difficulty—or with IBM's new multiprotocol routers.

BY WAYNE RASH JR.

"I can't believe IBM kept NetBIOS," one user said, shortly after finding out that his new multiprotocol router wouldn't work with OS/2's native network protocol. "It's just more baggage from Microsoft," another one said. "Hasn't IBM ever heard of routers?" a system integrator asked.

Why all the concern about how a network protocol works in this era of near-universal connectivity? In simple terms, it's because two widely used means of transferring information across networks don't work well in today's router-based network environments. Those two means of moving information happen to be two of the most popular at IBM—Systems Network Architecture (SNA) and NetBIOS.

Of these two, SNA is the most important to most IBM users. SNA, or more correctly the set of protocols that make up SNA, is what network operators call "connection-oriented." That means that before a communications session can take place, there must be a logical connection between the user on one end and the service on the other. The connection might take place between a 3270 terminal and a communications processor, for example.

Because SNA is connection-oriented, it expects the connection always to be there. Thus, if one end checks to see if the other end is there and doesn't find it, it should end the session. But when a network is sent across a router, there is no connection. The information traveling on the network is transferred in packets across to another network, but there is no way to check for an actual connection. For this reason, SNA hasn't been used on the increasingly popular router technology-based networks—until recently, that is.

The NetBIOS Problem

While NetBIOS isn't a connection-oriented system like SNA is, it still won't pass across a router because of limitations in its addressing scheme. "This presents scalability problems," explains Ed Ward, a senior principal and the network services manager for American Management Systems, Inc. in Arlington, Virginia. AMS is a large user of SNA on its enterprise network, but is moving away from NetBIOS because of difficulties in using it on large networks.

If NetBIOS is so hard to use, why does anyone use it? One reason is that it's the standard protocol for some versions of IBM's LAN Server product. In addition, it's the standard protocol for Microsoft's Windows for Workgroups and for Windows NT. All of these products are, according to Bob Koch, Senior Product Manager for Proteon, Inc., of Westborough, Massachusetts, "carrying around the baggage of NetBIOS."

Routing the Non-routable

So NetBIOS is baggage, and SNA needs connections, and neither will pass through today's router-based enterprise networks unaided. What's the solution?

One of the products that IBM added to its catalog in 1993 was something known as the IBM 6611 multiprotocol router. Despite its intimidating name, the IBM 6611 was designed to be a solution for all those IBM customers stuck with non-routable network protocols in today's router environment. Using a feature called Data Link Switching, the IBM 6611 proved able to route the previously non-routable SNA and NetBIOS LAN traffic.

More importantly, the IBM 6611 was a true multiprotocol router. In addition to handling DLS, it would route IP and IPX traffic across internetworks, and in general provide a single solution for the needs of companies with lots of protocols to choose from. It was, in a sense, a dream come true.

"Customer requirements led to DLS," explained IBM's Roy Dixon. Dixon was a member of the team that invented DLS and in the process made unroutable protocols work on router-based networks. Along the way, Dixon, a senior engineer in IBM's Wide Area Networking division in Raleigh, North Carolina, solved a number of problems. One of the most important was the "seven hop" problem.

SNA has a design limit that allows it to cross a bridge between network segments no more than seven times. A bridge is a device that allows network traffic to move between segments when it detects network packets destined for a node on the network seg-

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ment on the other side of the bridge. Functionally, this is similar to the way a router works, although they work at different layers of the ISO network model.

When SNA was developed, this wasn't a problem. But as networks have grown and complexity has increased, a maximum of seven bridge crossings has proved to be a real limitation. With today's complex networks, it's common for network traffic to pass more than seven bridges. The result is that SNA traffic is prevented from using the entire network.

The IBM 6611 solves this problem by allowing SNA traffic to move across a router. It does this by receiving otherwise non-routable traffic, encapsulating each data packet in a routable network packet, and sending it on to the router on the appropriate network segment, usually a wide area network segment running TCP/IP. As you might imagine, this process of enclosing one data packet inside another isn't very efficient, since it results in considerable overhead, but it does work.

The Wrong Platform

This process of encapsulation works well, if somewhat slowly, in the IBM 6611. "They picked the wrong platform to base it on," says Louise Herndon Wells, director of IBM Internetworking at the Internetwork Technology Institute in Milpitas, California. According to Wells, the IBM 6611 is based on a Unix platform that lacks sufficient processing power to keep up with the demands of both routing and encapsulation. Other router manufacturers, including Proteon, as well as Novell, Wellfleet, and Cisco also sell multiprotocol routers and will be releasing DLS for their products later this year.

The slowness has caused some dissatisfaction among those trying to use multiprotocol routers for SNA and NetBIOS traffic. SNA users complain of inconsistent response time. "SNA users are used to seeing a consistent response, even if it's slow," Wells explains, pointing out that because the IBM 6611 is routing the SNA traffic across a TCP/IP network, the traffic is subject to the less predictable nature of that protocol.

Adding to the problem of using multiprotocol routers to route non-routable protocols is that NetBIOS can be a noisy neighbor, engaging in what network engineers call "broadcast storms." These result when a node on a network sends out a broadcast packet, meaning that it is addressed to every other station on the network. These broadcast packets may cause a reply from the other nodes, resulting in still more network traffic. According to Ed Ward, while a broadcast storm may not interfere with the use of a smaller network, on a large one "it can bring operations to a stop."

The problem with routers is that they effectively create the

appearance of a large network where there were once two smaller ones, thus intensifying broadcast storms. In addition, because the link between these two networks is frequently a WAN with relatively limited bandwidth, a broadcast storm can bring processing to its knees.

Are Routers Worth It?

With all of the problems that can happen with a multiprotocol router in a heavily OS/2 and IBM mainframe environment, why use them? The answer is that despite their problems, on balance they may make life easier for enterprise network managers. But whether or not a company uses routers in its enterprise environment depends on the company's needs.

Many companies, for example, have relatively little SNA traffic on their networks. For those companies, the added complexity of running both bridges and routers on a network may more than offset any problems there may be managing routers. Besides, "Bridges have performance problems, too," says Wells.

NetBIOS is another problem, but one that many say has an easy solution—stop using it. Neither OS/2 nor LAN Server requires NetBIOS, and in fact, both will work well using the more robust TCP/IP or IPX protocols. TCP/IP is the native protocol of the Unix world, but has rapidly become an industry networking standard. IPX is Novell's native protocol, and runs on about 75 percent of all networks in the world.

Ed Ward argues that a company should examine the business case before dropping NetBIOS, but suggests that where possible, TCP/IP should be adopted. "It's the *de facto* standard," Ward says.

Most observers agree, and in fact, an effort to standardize on the use of Internet Protocol (the "IP" part of TCP/IP) was one of the reasons IBM developed the 6611 router in the first place. Still, there are no easy answers. Every network is unique in some way, and it's these differences that make predicting network performance a black art. While there are general guidelines, certainties are much harder to come by.

Should you move to a router-based network? Most network engineers think that this might be a good idea—eventually. The problem is when to move, and for that, it depends on your individual situation.

In general, if your traffic is mostly routable LAN protocols, a router-based network probably will work well for you. If you use mostly SNA, you probably will want to use something else, perhaps bridges, or perhaps multiplexing on your WAN. If you're using non-routable protocols such as NetBIOS, on the other hand, maybe it's time to move to something that's heading in the same direction as the industry. ◆

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SCOOPS

Tangled web of OS/2 upgrades

IBM will soon begin beta-testing a small OS kernel that will run OS/2 reliably on a 4mb PC. But opinion among project sources is divided whether the project—code-named Warp—is ready to go to beta. One key source declared, "I'm not even sure it is technically feasible at this point." If the project does come to fruition, IBM has it targeted for a June release.

Warp is being developed by a group separate from the OS/2 2.2 development team, which means that Warp and 2.2 are separate products. Release of the 2.2 upgrade was originally scheduled for December 1994, but has been advanced by IBM officials, first to September and most recently to June.

Big Blue planners are therefore faced with the prospect of either dealing with two simultaneous OS/2 product releases, or avoiding cross-purpose development and marketing efforts by merging the two products for one June release.

Now, however, the entire question may be moot. Sales of OS/2 for Windows have been so brisk since its November 1993 rollout that some IBM strategists are debating whether the 2.2 and 4mb releases should be delayed to avoid further distracting the market. IBM insiders estimate that about one million copies of OS/2 for Windows have already been sold.

Proponents of a delay argue that IBM must respond to a changed market situation in which the company must make the most of limited marketing dollars while avoiding sending conflicting messages about its desktop strategy. On the other side are those who believe that the 4mb version will help capture numerous 386 and 486 machines not easily upgraded to 8mb of RAM.

New Products

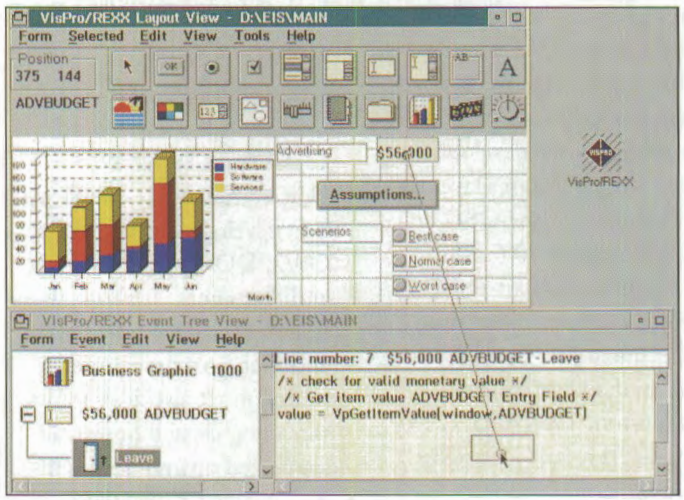
But where's the silver?

HockWare is shipping version 2.0 of the VisPro/REXX product set, which consists of the Bronze and new Gold editions, used for building OS/2 GUI applications. Both versions include support for creating visual REXX macros, adding objects using IBM's System Object Model and accessing the Q+E Database Library. The Gold edition also features three-dimensional graphics display, full-motion multimedia capabilities, and a DB2/2 database designer.

Special pricing is available until March 31. Bronze and Gold versions cost $99 and $299 respectively; and an upgrade from Bronze to Gold costs $159. Until March 31, users can upgrade to version 2.0: Bronze, $39; Gold, $59. HockWare, Inc., 104 Fountain Brook Circle, Suite C, Cary, NC 27511, (919) 380-0616, fax (919) 380-0757.

Time to file

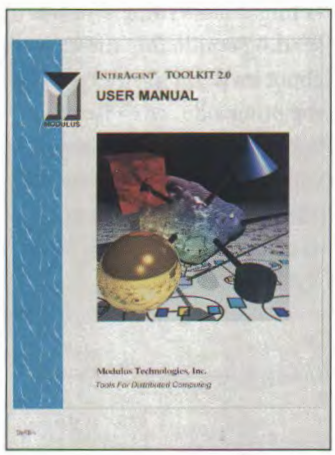
Shipping just in time to pull you out of this year's income tax abyss, TAXDOLLARS 1993 is an OS/2-specific application from BT&T Consumer Technology. The software eases the process of filing federal taxes by automating all calculations. The finished return, form 1040PC, can then be electronically sent or printed in OCR format for mailing to the IRS. In addition, TAXDOLLARS 1993 has a "what if" scenario generator that allows the user to explore filing options in order to minimize the taxes owed. TAXDOLLARS costs $19.95 plus



shipping and handling. BT&T Technology, Inc., 30251 Golden Lantern, Suite E-405, Laguna Niguel, CA 92677, (714) 953-8299, fax (800) 829-3657.

Writing between the lines

InterAgent version 2.0, a middleware toolkit that allows the user to write and distribute applications in mixed



hardware and software environments, is now available from Modulus Technologies. InterAgent uses an object-oriented mechanism and an API to simplify the development of communications layer code. The price for the OS/2 environment is $670 for the developer's toolkit and $275 for the routers. Modulus Technologies, Inc., 2503 Robinhood, Suite 265, Houston, TX 77005, (713) 523-7211, fax (713) 523-7433.

Preventive medicine

Reflex, Inc. is shipping an OS/2 version of its Disknet v2.15 proactive anti-virus software solution. Disknet is a "security shield" that scans one or more PCs. The software also includes password protection, matrixed scanning, and a behavior blocker/activity monitor. The price of the security application is $95. Reflex, Inc., 24120 Brier Rd, Brier, WA 98036,(206) 487-2798, fax (206) 486-5139.

Is it time?

Now available from Hilbert Computing is Chron 4.0 for OS/2, a 32-bit, multithreaded OS/2 DOS and Windows applications scheduler. Scheduling can be set in minutes, days, weeks, months, or years; complex scheduling (such as the first Wednesday of every month) can be programmed, as can simple one-time items such as reminder messages. The software costs $99. Hilbert Computing, 1022 N. Cooper, Olathe, KS 66061, (913) 780-5051, fax (913) 829-2450.

Porting with ImageSoft

ImageSoft has announced ClassWorks by XNET Corporation, a C++ application development library for OS/2, DOS/Windows, NT, and Automotif. It allows users to write the code only once and then port between environments. It also adds multithreading capabilities to all supported operating systems. The product costs $699. ImageSoft Incorporated, 2 Haven Avenue, Port Washington, NY 11050, (516) 767-2233, fax (718) 767-4307.



Rest your wrist

More and more "ergonomically correct" products are hitting the market. One of the most recent is the RxWrist, a plastic bar with rubber sliding sleeves designed to follow hand movements, from Micro Balanced Products. The RxWrist is simple in design, with options for adjusting the height of the bar, and is designed to prevent repetitive strain injuries. $19.95. Micro Balanced Products, 25 Aladdin Avenue, Dumont, NJ 07682, (800) 799-7478.

Brooktrout times two

Two new products, Fax and Voice Application Development Tools for OS/2 and TR118, are available from Brooktrout Technology. The Fax and Voice Application Tools, which aid in the development of fax servers and integrated fax and voice processing systems using Brooktrout boards, are priced at $300 in object code and $1,500 in source code. The second product, TR118, is an eight-channel, eight-DSP (digital signal processor) universal port card. Offering advanced fax and voice processing on eight channels, the card is used for high-volume communication transactions such as a newswire service. The price of the TR118 is $6,195 with volume discounts available for OEMs, resellers, and developers. Brooktrout Technology, Inc., 144 Gould Street, Needham, MA 02194, (617) 449-4100, fax (617) 449-9009.

Linkin' It

DataLink, a Denmark-based company, offers OS/2 faxing with TS/2 LANfax, a multiuser fax communication system. TS/2 LANfax is installed directly onto the OS/2 network file server. Pricing is based on the Danish Crown. DataLink Telecommunications A/S, Aldersrogade 6D, DK-2100 Copenhagen, Denmark, (+45) 39-274800, fax (+45) 39-273906.

News

IBM tops patents list

For the first time since 1985 a U.S. company is heading the list of most patents awarded to a company, and that company is IBM. Big Blue received 1,088 patents, mostly in the information processing field, in 1993. Second place was taken by Toshiba Corporation, followed by Canon KK and Eastman Kodak Company.

Peer OS/2 now in restricted beta

Peer OS/2, IBM's peer-to-peer networking product, in mid-February entered limited beta testing by a "restricted group of 10-12 people," according to company sources. It now appears likely the product will go gold in Q4 rather than at mid-year.

Wally Casey, PSP's director of marketing, explained the delay as "a change in plans." As a result of that change, the product now is expected to allow access to server-based networks as well as peer networks. Integration into OS/2 will be via the System Object Model (SOM). IBM has not yet decided whether to ship it as an add-on or a standalone OS/2 system.

IBM announces 1994 co-op advertising program

In the face of a determined onslaught by Microsoft and its allies, IBM's Personal Software Products division has decided to provide renewed advertising support for ISVs and OEMs in the form of a new co-op advertising program.

How much real support that will mean for small companies, however, remains to be seen.

Under the PSP 1994 Cooperative Advertising Program, publications will sell advertising at discounted rates to companies whose products have been certified by PSP. According to a Jan 28 letter from Joanne Meleski, PSP's advertising manager, participants must first have their advertising concepts approved by PSP's advertising agency, Lintas:New York.

Although IBM will control the program, it will not resemble other advertising programs in that the company does not plan to provide any reimbursement to defray the costs of the ads. ◆

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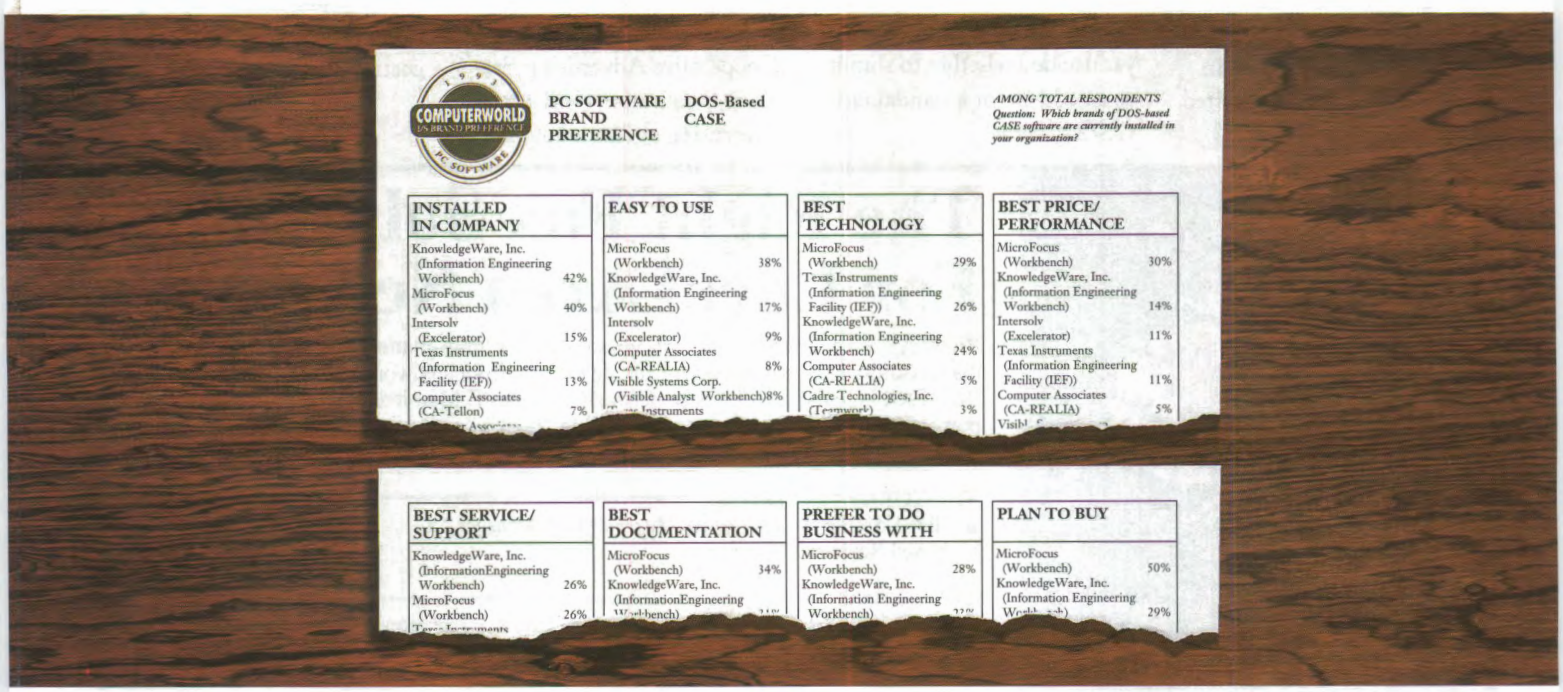
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Circle #194



Spruce up that Desktop!

BY GORDON SCOTT

You may think that efforts to tailor the OS/2 Workplace Shell on every desktop in your department aren't worth the time. Perhaps you think that making the screen look pretty won't help your users work any faster or more productively. But remember that the appearance of OS/2's desktop and objects is what gives users the visual cues necessary to complete their software tasks. If those cues are vague, ugly, or awkward, you've potentially introduced a roadblock to productivity. Here are some tips and techniques for improving the utility of the desktop by sprucing up its look and feel.

Use bitmaps within folders to create distinctive backgrounds.

How to do it:

- Open the folder you'd like to work with.
- Select the folder's system menu (from the left corner of the title bar).
- Select the arrow by **Open**, then **Settings** from the cascade menu.
- Select the tab labeled **Background** on the settings notebook.
- Select the **Image radio button** on the Background page.
- Select a bitmap to use from the **Image File** list provided.
- Close the notebook.

What this buys you: a folder background easily distinguishable from any other open folder area.

Putting bitmaps can be a very effective way to establish quick recall. This visual cue helps you find programs and objects you may use only occasionally. A bitmap is more effective if it provides good contrast to your icon text color. If you have set the color of your icon text to white, yellow, or something similar, BRICKS.BMP, ROOF.BMP, and STARS.BMP create effective backgrounds. If your icon text is a darker color, BLOCKS.BMP, SCALES2.BMP, and STARS.BMP are effective backgrounds.

Use the Font palette to improve the readability of icon text.

How to do it:

- Bring up the desktop's pop-up menu by clicking the right mouse button once on an open desktop area.
- Select the **System Setup** menu item just below **Shut down**.
- Double click on the **Font palette** object in the System Setup folder.
- Select a font from the list of fonts displayed on the Font palette.
- Press and hold the right mouse button, then drag the mouse pointer over the desktop. (Notice that the mouse pointer appears as a small pencil during the drag operation.)
- Release the right mouse button to apply the font to the icons on the desktop.

What this buys you: text readability.

High-resolution monitors give users the benefit of more screen space to work with. More pixels mean more places to put everything. It also means everything is slightly smaller—including fonts. For some, the default font of 10 point Helvetica for icon text may be too small for comfort. For others, the default font for menu items may be too large. Using these steps, you can change the font size.

You can change fonts on just about any text window except for the Help panels. Your changes, however, may not be permanent. Title bar font changes will be permanent, but changes to fonts for entry fields, pushbuttons, check box labels, and the like will disappear as soon as the application is closed. That's because the application controls the fonts of all but the few settings specified by the system.

Add new fonts to your system.

How to do it:

- Locate the font files you want to add, and copy or download them.
- Double Click on the **Font palette** object (in the System Setup folder).
- Select the **Edit** pushbutton. (A dialog box appears.)
- Select the **Add** pushbutton. (Another dialog box appears.)
- Place a diskette with your font files into drive A (or specify the drive and directory where the new font files are located).
- Specify where you want OS/2 to keep those files, or accept C:\PSFONTS as the default directory.
- Select the **Add** pushbutton.

To add these fonts to your Windows sessions follow these steps:

- Open a Win-OS2 session (either full-screen or windowed).
- Double-click on the ATM Control Panel object in the Win-OS2 Main application group.
- Select the **Add** pushbutton.
- Select the path where the font files can be found in the Directories list box. (Once you identify the appropriate

directory, font names will appear in the field labeled **Available Fonts.**)

- Select the fonts you want to add to your Windows programs.
- Select the **Add** pushbutton.

What this buys you: added fonts for both screen and document use.

If you add Adobe Type 1 fonts to your system your word processing program can use any of these fonts in a document. Many local printer dealers stock a selection of Adobe Type 1 fonts. You can also purchase the Hobbes OS/2 CD-ROM from Walnut Creek, which contains several extra Postscript fonts.

The drawback to using fonts is, of course, the space they require. The data for one font may vary in size from 30k to 60k for all of the necessary files. Adding one or two fonts to your departmental systems certainly won't fill up the hard drives. But you shouldn't add dozens of fonts without good reason, because free disk space can shrink rapidly. You should also consider the needs throughout the department or company and standardize on a few basic choices.

You need three files to make a single Adobe Type 1 font available for both OS/2 and Windows applications. The files will have the extensions *.AFM, *.PFM, and *.PFB (*.AFM is for OS/2, *.PFM is Windows, and *.PFB is the base font file). So if you want to add Bodoni (a thick, easily readable screen font) to your font choices, place BODONI.AFM, BODONI.PFM and BODONI.PFB in the same directory or on diskette, and refer to this directory when adding new fonts.

(A note to Internet users: Bodoni and 452 other fonts are available from FTP site **Hobbes.nmsu.edu** in the directory /os2/all/fonts. All three necessary files are placed neatly in a single *.zip file.)

Create a dashboard menu system constructed from folders.

How to do it:

- Create a new folder to be a menu. (Do this by tearing a folder off the folder template, or by selecting **Create another** from the pop-up menu of any other folder).
- Size the open menu folder in the lower left corner of the screen. (A good size would be 20% of the screen's height and 33% of its width.)

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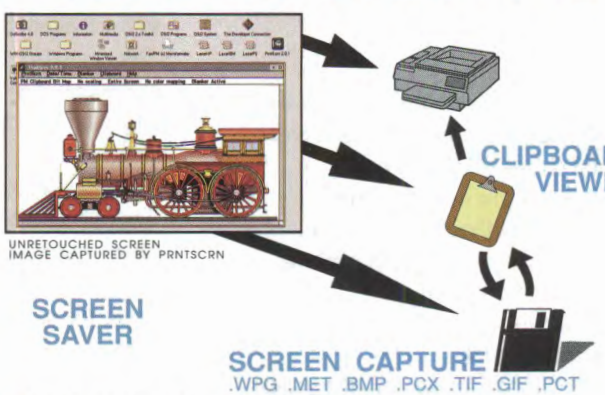
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- Create four or more new folders within the menu folder, and give each of them a general name. (You may already have folders named this way; for example, 'Tools and Utilities' or 'DOS programs' or something similar. If so, simply move them into the newly created folder.)
- Change the menu folder's View settings to **Flowed** and **Invisible**. (These settings are specified by radio buttons on the first page of the folder's settings notebook.)
- Be sure the font within the menu folder is easily readable. (You may need to change the size, the font, or the color of the text, but do whatever is necessary to make this the most readable folder on your screen.)
- Open each of the folders listed in the menu folder, then move and size them to occupy the lower right corner of the screen.

What this buys you: a quick menu system.

Standardizing your department's folders like this may raise a few hackles among your users if they aren't already using a similar Dashboard scheme. Once they become familiar with the contents and positions of each folder, they'll find that they can rapidly navigate their way through the most important application folders.

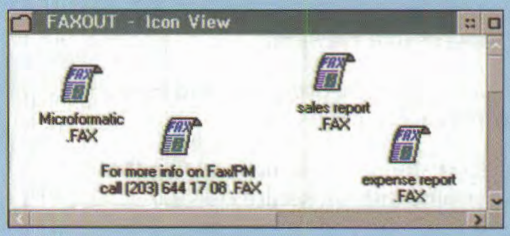
You should customize and document the arrangements for particular departments (and job functions). Thus, the programmers might have folders such as Utilities, Compilers, Command Prompts, and Editors, while the word processing department might have Word Processing, Boiler-plate Documents, Utilities, and Graphics.

With very little investment of time this arrangement can yield quick returns through improved speed and accuracy while managing tasks with desktop objects.

Consider changing the font of your menu text from System Monospaced to Helvetica 10 or 12 point size and the title bar text to Times New Roman 12 point. Such a subtle change can have significant impact on your system. Helvetica is skinnier than the default system font, so your menus actually take up less space. For many applications, this can make quite a difference in the way you use the menus.

Create a sidebar menu system with vertically oriented folders.

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How to do it:

- Create a new folder (which you will use as a menu).
- Size the open menu folder in the upper right corner of the screen. (A good size would be 25 percent of the screen's width and about 33 percent of its height.)
- Create or place folders within the menu folder.
- Change the menu folder's View settings to **Non-flowed** and **Invisible**.
- Set the font within the menu folder to something easily readable.
- Open each of the folders listed in the menu folder and size them to take up the lower right corner of the screen. The proportions could be about 25 percent of the width of the screen and 50 percent of the height or more for the secondary folders.

What this buys you: a quick menu system positioned vertically on the right side of the screen.

This is a variation on the Dashboard style menu arrangement. Which of the two arrangements works best will depend on the size of the windows in which the applications run. If the windows for the applications appear taller than wider (such as a single full-page word processing view), the sidebar menus will be more effective. If the windows appear wider than taller (such as spreadsheets and databases), dashboard-style, horizontal menus work best. You should aim for an arrangement that allows access to multiple program windows with the least amount of window re-arrangement. ◆

Gordon Scott writes on-line help and tutorials for OS/2 applications at IBM's Santa Teresa Laboratory in San Jose, California. Share your tips with OS/2 Professional readers by sending them through the Internet to gscott@stlvm22.vnet.ibm.com.

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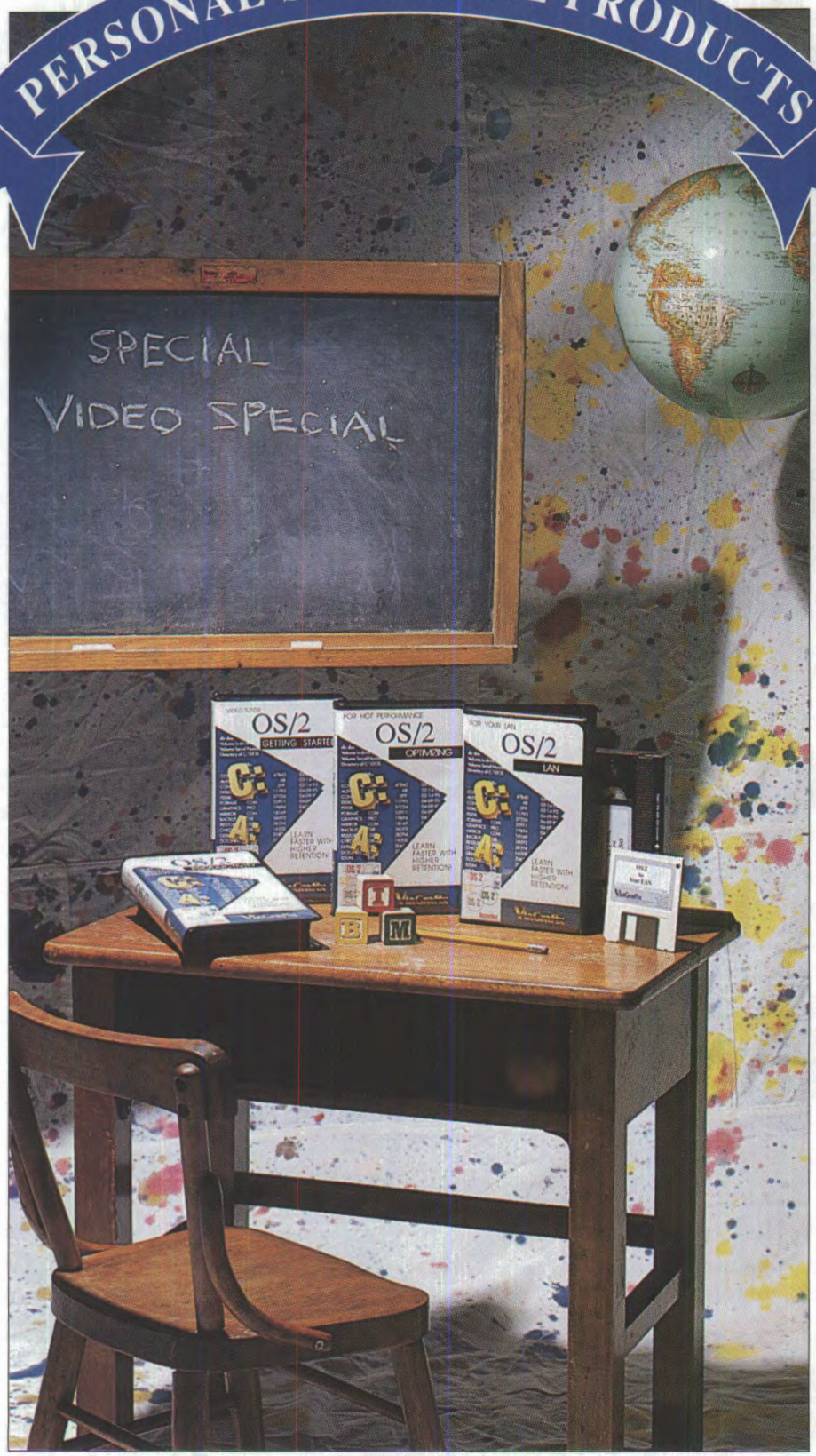
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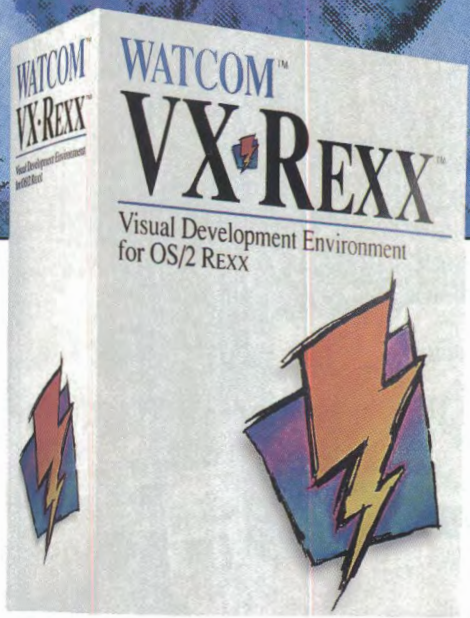
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1010 CODE CACHE 0101

Now That I Have C++ (and 50,000 Lines of Code)...

BY CAREY GREGORY

In the November *Code Cache*, David Moskowitz and Christopher Wees presented a simple PM program written in C with the OS/2 Toolkit, and compared it to an equivalent program written in C++ using IBM's User Interface Class Library (UICL). No programmer seeing the two side by side could help but be impressed by the simplicity that C++ and the UICL bring to PM programming. A package such as the UICL has been long overdue, and now that it's here it's bound to be embraced with enthusiasm by PM programmers everywhere.

If you're one of the many still writing PM programs the hard way (that is, using C and the OS/2 Toolkit), I can't stress strongly enough that you should take a long look at the UICL when it comes time to start your next PM program.

That's all well and good, you say, but what about that 50,000-line monster I've got sitting over in the corner? We all know it's usually not practical to completely rewrite a large production application, even if the end result is smaller, simpler, and more maintainable. The reality most of us must face is living with existing PM programs written without the benefit of C++ and the UICL.

But rather than simply living with your monster and watching it grow even bigger and meaner over the years, perhaps the solution lies in converting it to C++ so that it can take advantage of PM class libraries as opportunities arise.

Converting most C programs into C++ is a straightforward process since C++ is a superset of C. You can, of course, convert an entire program all at once; or, you can convert it piece by piece as time allows, since C++ compilers will tolerate standard C syntax in almost any context. Evolving a C program this way won't produce truly elegant C++ (after all, object-oriented program-

LISTING 1

Much of the program within these listings contains only minor changes from the September 1993 installment. Most of the changes may be accomplished with a global replacement of `pGlobalData->` with `classData.`

In addition, a few assignments to `pGlobalData` may be removed (the first lines after case `WM_CREATE` have been left intact as an example).

To better highlight the differences, we have removed nearly identical sections of code and replaced these sections with `/*...*/` within the body of the listing.

The complete listing of the revised C++ program can be downloaded from BIX. Join os2.pro/listings and RECEIVE (download) MAR94CC.ZIP.

```
#define INCL_PM   // include all PM constructs
#define INCL_DOS  // include all base o/s constructs

#include <os2.h>
#include <stdio.h>
#include <memory.h>
#include <stddef.h>
#include <errno.h>
#include <string.h>
#include <process.h>

#include "pmcnr.h"
```

CONSTANTS

```
#define DEFAULT_VIEW  ID_VIEW_TREE
                     // default container view
#define FINDBUFF_ENTRIES  10
                    // find buffer entry count
#define CNRREC_SIZE   (sizeof(CNRREC)-
                      sizeof(MINIRECORDCORE))
```

DATA DEFINITIONS

```
/*
...
*/

typedef struct _CLASSDATA  // global program data
{
   HAB            hab;     // anchor block handle
   HMQ            hmq;     // message queue handle
   HWND           hFrame,  // frame window handle
                  hClient, // client window handle
                  hMenu,   // app menu handle
                  hContainer; // cntnr window handle
```

```
   RECTL         rclUpdate;   // window update rect
   char          *pszText[MAXLINES];
                              // screen buffer
   short         sLineCount,  // scr buf line count
                 sCharHeight, // character height
                 sTopLine;    // index of top
                              // visible line
   char          szFileName[CCHMAXPATH];
                              // input file name
   short         sCloseFile;  // abort flag
   char          szCurrDir[CCHMAXPATH];
                              // current directory
   USHORT        usView;      // current view id
} CLASSDATA;
```

CLASS DEFINITIONS

```
class ContainerApp
{
  public:

    ContainerApp(void);
    ~ContainerApp(void);

    MRESULT ClientWndProc(HWND,ULONG,MPARAM,MPARAM);
    ULONG  FillContainer(HWND, CNRREC *, char *);

    CLASSDATA   ClassData;

  private:

    HWND     CreateWindow(void);
    MRESULT  ClientWndInit(HWND);
    void     FileOpen(HWND, char *);
    void     FileClose(HWND);
    void     CalcLinePosition(HWND, short, RECTL *);
    HWND     CreateContainer(HWND);
    void     SetView(HWND, USHORT);
};
```

FUNCTION PROTOTYPES

```
void main(void);
static MRESULT EXPENTRY
  ClientWndProcWrapper(HWND, ULONG, MPARAM, MPARAM);
static void _Optlink ReadFileThread(void *);
static void _Optlink FillContainerThread(void *);
```

LISTING 2

MAIN()

```
void main(void)
{
   ContainerApp FileContainer;
}
```

CONTAINERAPP CONSTRUCTOR

```
ContainerApp::ContainerApp(void)
{
   QMSG  qmsg;

   memset(&ClassData, 0, sizeof(ClassData));
   /* Initialize PM */
```

ming is more a matter of design than syntax), but it will help you exploit the many benefits C++ offers over C.

To illustrate the process of converting a C program into C++, we'll convert the PM container program that appeared in last September's *Code Cache*. [Editor's Note: Despite an erroneous attribution to Todd Crowe, Carey Gregory was the author of both the code and the article.] Though we could go all the way and replace the PM API calls with objects from the UICL, let's be more conservative (and realistic about the deadline pressures you will face in converting apps) and begin with a few basic changes to the code.

From Borland to IBM

The first change is switching from the Borland C++ (used to develop the original code) compiler to the IBM C++ compiler (to take advantage of IBM's UICL). A few small problems arise when first compiling the original code with the IBM compiler. The first two are related to the **beginthread()** function. The Borland version omits the stack pointer parameter entirely, while the IBM version retains the pointer as a parameter (for compatibility with earlier versions only—the parameter is ignored). Simply adding a NULL stack pointer parameter to the call fixes the problem.

The second change adds the **Optlink** keyword to the thread function declarations. Supposedly, this step should not be necessary, since the **Optlink** calling convention is the default. However, the compiler simply wouldn't quit complaining without the modification.

The final change relates to the behavior of the **errno** variable when an end-of-file condition is encountered. The Borland runtime library leaves **errno** set to zero on end-of-file, while the IBM runtime library sets it to 29 (read past end-of-file). This simple fix requires some minor modifications to the error detection logic in the file input thread—we replace the **FIELDOFFSET** macro with the **offsetof** macro. The IBM compiler apparently performs more stringent type checking than the Borland compiler, and by doing so reveals that the **FIELDOFFSET** macro as supplied in the toolkit is broken. The macro casts a 32-bit pointer to a 16-bit short, which the Borland compiler was willing to accept but the IBM compiler was not. Regardless of the error,

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the change should be made since the **offsetof** macro, unlike **FIELDOFFSET**, has the ANSI stamp of approval.

After making the compiler-specific changes, the first step in converting the example program to C++ is declaring a class to encapsulate the data and methods of the program. In a larger program you should define several classes by identifying modules and functions that would group into isolated objects. Listing 1 shows the data declarations, class definition, and function prototypes for the revised program. There's nothing new about the data declarations except that the structure **GLOBALDATA** has been renamed to **CLASSDATA** and made a member of the **ContainerApp** class. Although you needn't keep these variables within a structure when changing to class data, it simplifies the conversion process, since the variables are already referenced as structure members throughout the program.

Class Data Protected

While not always immediately apparent when writing a C++ program from scratch, the conversion from C highlights several of C++'s advantages. For example, the dilemma of managing global variables in a re-entrant and/or multithreaded environment instantly vanishes, since a class encapsulates all of its own data, and each instance of the class receives a separate copy.

This is exactly what PM programs have always needed. Syntactically, class data resembles a global variable in that any class member may access the class data without qualification. However, unlike a global variable, class data is invisible to non-member functions and thereby protected from inadvertent modification. The class definition shown in Listing 1 contains the **CLASSDATA** structure as a member. As a result, the member functions no longer need to pass a pointer to the structure as a parameter.

Notice that in addition to the constructor and destructor functions defined in the **ContainerApp** class, two additional functions and the **CLASSDATA** structure are declared as public. Generally, you should make class members public only when they're really intended as such. However, the IBM C++ calling conventions make private definitions difficult in this case. All class member

```
   ClassData.hab = WinInitialize(0);

   /* Create a PM message queue. */

   ClassData.hmq = WinCreateMsgQueue(ClassData.hab, 0);

   /* Register the client window class. */

   if (WinRegisterClass(ClassData.hab, CLASSNAME,
                        ClientWndProcWrapper,
                        CS_SIZEREDRAW, sizeof(CLASSDATA *)))
   {
      /* Create the frame and client windows. */

      if (CreateWindow())
      {
         /* Dispatch messages until a WM_QUIT message is
received. */

         if (ClassData.hClient)
            while (WinGetMsg(ClassData.hab, &qmsg,
                        NULLHANDLE, 0, 0))
               WinDispatchMsg(ClassData.hab, &qmsg);
      }
   }

   return;
}
```

CONTAINERAPP DESTRUCTOR

```
ContainerApp::~ContainerApp(void)
{

   /* Destroy the message queue. */

   if (ClassData.hmq)
      WinDestroyMsgQueue(ClassData.hmq);

   /* Terminate use of PM and release all resources. */

   if (ClassData.hab)
      WinTerminate(ClassData.hab);

   return;
}
```

CONTAINERAPP::CREATEWINDOW()

```
HWND ContainerApp::CreateWindow(void)
{

/*
...
/*

  hClient=WinCreateWindow(hFrame, CLASSNAME, NULL,
                          0, 0, 0, 0, 0,
                          hFrame, HWND_BOTTOM,
                          FID_CLIENT, this, NULL);

  ClassData.hClient = hClient;

  /* Activate, size, and position the window. */
  WinSetWindowPos(hFrame, HWND_TOP, swp.x, swp.y,
```

```
                swp.cx, swp.cy,
                SWP_SIZE | SWP_MOVE | SWP_SHOW |
                SWP_ACTIVATE | SWP_ZORDER);

   return (hFrame);
}
```

CLIENTWNDPROCWRAPPER()

```
static MRESULT EXPENTRY
  ClientWndProcWrapper(HWND hwnd, ULONG msg,
                       MPARAM mp1, MPARAM mp2)
{
   ContainerApp   *pCnrApp;

   /* On the WM_CREATE message, mp1 contains a
      pointer to the class. */

   if (msg == WM_CREATE)
   {
      pCnrApp = (ContainerApp *)PVOIDFROMMP(mp1);
      WinSetWindowPtr(hwnd, 0, (void *)pCnrApp);
   }
   else
      pCnrApp =
         (ContainerApp *)WinQueryWindowPtr(hwnd, 0);

   return (pCnrApp->ClientWndProc
```

functions use the **Optlink** calling convention—it cannot be overridden by the programmer.

On the other hand, PM expects window procedures to use the **System** calling convention. If any function in this program should be a class member, the window procedure is certainly it. However, the compiler won't allow a window procedure to be declared within a class, so a wrapper function (that is not a class member) must be built. Thus **ClientWndProcWrapper()** has only one purpose—to provide a function whose calling convention satisfies PM. This one limitation sets a domino effect in motion that requires the development of an additional function, and forces a public definition of the class data when, by convention, it should be private.

A similar problem arises with threads. The strict type checking of the IBM C++ compiler combined with the definition of **_beginthread()** will not permit passing a class member function address as the starting address. (Presumably, the intent of the designers was for pro-

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grammers to use the **IThread** class instead of the **_beginthread()** function.) While the UICL largely eliminates the need for window procedures, it was unrealistic for the compiler designers to assume that every window procedure in the world could be replaced with a UICL object overnight. The compiler should allow calling conventions to be specified by the programmer for all functions, including class member functions.

Listing 2 shows the remaining source for the revised program, including the new class constructor and destructor, **ContainerApp()** and **~ContainerApp()**. If you're new to C++, the **main()** function may puzzle you a bit. In C, a **main()** function with only a single declaration and no executable code would be nonsensical, but in C++ it makes perfect sense (and is actually quite common).

By definition, C++ calls the constructor for a class when an instance of the class is created. In this case, the class is instantiated upon entering **main()** and bringing

```
            (hwnd, msg, mp1, mp2));
}
```

CONTAINERAPP::CLIENTWNDPROC()

```
MRESULT
   ContainerApp::ClientWndProc(HWND hwnd, ULONG msg,
                               MPARAM mp1, MPARAM mp2)
{

   int               i;
   short             sError;
   char              *psz,
                     szErrBuff[128];
   HPS               hps;
   RECTL             rcl,
                     rclText;
   MRESULT           mr;
   USHORT            id;
   CNRREC            *pcr;
   CNRINFO           cnri;
   NOTIFYRECORDENTER *pnre;



   switch (msg)
   {
      case WM_CREATE:
```


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```
        return (ClientWndInit(hwnd));

/*
...
*/
     case UM_LINEOFTEXT:
        if (ClassData.sLineCount < MAXLINES)
           ClassData.sLineCount++;
        else
        {
           /* buffer full, discard top line */

           delete [] ClassData.pszText[0];1

           for (i=0; i<ClassData.sLineCount-1; i++)
              ClassData.pszText[i] =
                     ClassData.pszText[i+1];
        }
        ClassData.pszText[ClassData.sLineCount-1] =
           (char *)PVOIDFROMMP(mp1);

        CalcLinePosition
           (hwnd,ClassData.sLineCount-1, &rclText);

        if (rclText.yBottom <= 0)
        {
           if (ClassData.sLineCount < MAXLINES)
              ClassData.sTopLine++;

           WinScrollWindow(hwnd, 0,
                           ClassData.sCharHeight,
                           NULL, NULL, NULLHANDLE,
                           NULL, 0);

           ClassData.rclUpdate.yTop +=
             ClassData.sCharHeight;
        }
        else
           ClassData.rclUpdate = rclText;

        WinInvalidateRect(hwnd,
          &ClassData.rclUpdate, FALSE);

        return (MRFROMSHORT(0));

     case UM_ENDOFFILE:
       sError = SHORT1FROMMP(mp1);
       if (sError)
       {
         sprintf(szErrBuff,
                 "Error %d accessing %s.",
                 sError, ClassData.szFileName);
        WinMessageBox(HWND_DESKTOP, hwnd,
                 szErrBuff, "ERROR!", 0,
                 MB_OK | MB_ICONEXCLAMATION);

           /* Do cleanup. */

           FileClose(hwnd);
        }
        return (MRFROMSHORT(0));

/*
...
*/
```

FileContainer into scope, hence the constructor is called upon entering **main()**.

If you examine the constructor function, you'll find that all of the initialization and message dispatch logic that appeared in the C version of **main()** now resides in the constructor function. It's debatable as to whether the message dispatch loop should reside in the constructor or should be a separate member function of the **ContainerApp** class (which could then be called from **main()**). Either way works, but by placing it in the constructor you can amaze and baffle your C programming friends by showing them a function with no executable code that actually does something.

In contrast, the destructor function is fairly unremarkable. It contains the termination logic that appeared in **main()** in the C version of the program. As you might expect, a destructor function executes when a class instance goes out of scope. In this case, it would run when **main()** returns.

Pointer Deleted

The changes to the remaining functions can be completed in a few hours. The most notable changes are the method used to access the **CLASSDATA** structure, and the appearance of the **ClientWndProcWrapper()** function (described above). If you examine the original C version, you'll notice a pointer to the global data structure in nearly every function definition. Even the window procedure stored the pointer in the window words of the client window and then queried it when needed. Since member functions have immediate access to class data as if they were local variables, it is no longer necessary to pass this pointer around—thus we have deleted it entirely. The only problem arises when the three functions that are not class members need access to the class data. The first of these functions is **ClientWndProcWrapper()**, which was registered with PM as the official window procedure. Upon client window creation, the **CreateWindow()** function passes a pointer to the class to **WinCreateWindow()** via the **this** parameter, a predefined pointer to the class which is available to any class member. **WinCreateWindow()** then passes the pointer to **ClientWndProcWrapper()** as a parameter of the **WM_CREATE** message. **ClientWndProcWrapper()**

stores this pointer in the window words of the client window for retrieval and usage by subsequent messages. Other than passing messages directly to **ClientWndProc()**, which is our real window procedure, this is the only action performed by **ClientWndProcWrapper()**.

The thread functions employ a similar mechanism for parameter passing. The **ReadFileThread()** and **FillContainerThread()** functions receive a pointer to the **ContainerApp** class as their only parameter. The pointer lets the receiving functions call member functions and access class data even though they are not class members.

Two final changes, while not strictly necessary, are very easy (and one adds to the C++ flavor of the program). The first replaces all calls to **malloc()** and **free()** with the C++ operators **new** and **delete**. The **new** operator is essentially a type-aware dynamic memory allocator. For example, to allocate an array of 100 characters you would simply code char `*p = new char[100]`. The **delete** operator (**new**'s counterpart) does exactly what its name implies. With **new** and **delete** you gain two advantages: they provide type and size checking, and they can allocate any type of object (including an instance of a class).

The second change specifies a full 32k stack size for both threads. While the 4k stack in the original example was adequate, a little generosity on the stack space should prevent strident letters to the editor regarding my parsimonious use of stack space and reliance on estimates rather than OS/2's dynamic stack growth mechanism.

As you can see, a few simple measures will aid your transition from C to C++. While your legacy code may not have the full flavor (or derive the full benefits) of a program designed with C++ from the ground up, you will cut the headaches and time required for a full-scale development and conversion effort. ◆

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```
            case ID_FILE_OPEN:
               FileOpen(hwnd, NULL);
               break;

            case ID_FILE_CLOSE:
               FileClose(hwnd);
               break;

/*
...
*/

   return (WinDefWindowProc(hwnd, msg, mp1, mp2));
}
```

CONTAINERAPP::CLIENTWNDINIT()

```
MRESULT ContainerApp::ClientWndInit(HWND hwnd)
{

   FONTMETRICS fm;


   /* Guarantee the state of the file-open and
     file-close menu items. */

   WinSendMsg(ClassData.hMenu, MM_SETITEMATTR,
              MPFROM2SHORT(ID_FILE_OPEN, TRUE),
              MPFROM2SHORT(MIA_DISABLED, FALSE));

/*
...
*/

   return (MRFROMSHORT(FALSE));
}
```

CONTAINERAPP::FILEOPEN()

```
void ContainerApp::FileOpen(HWND hwnd, char *pszFileName)
{


   /* If pszFileName is null, the FILE-OPEN menu item has
   been selected.  In this case, just create the container
   control and return. Otherwise, view the file that the
   user  selected from the container. */

   if (!pszFileName)
   {
      ClassData.hContainer = CreateContainer(hwnd);
      return;
   }

   strcpy(ClassData.szFileName, pszFileName);
   ClassData.sCloseFile = FALSE;

   /* Start the file input thread. */

  if (_beginthread(ReadFileThread, NULL,
                   32768, this) == -1)
   {
      WinMessageBox(HWND_DESKTOP, hwnd,
            "Can't start file input thread.",
             "ERROR!",   0, MB_OK |
```

```
            MB_ICONEXCLAMATION);
      return;
   }

   /* Disable the File-Open menu item. */

   WinSendMsg(ClassData.hMenu, MM_SETITEMATTR,
            MPFROM2SHORT(ID_FILE_OPEN, TRUE),
            MPFROM2SHORT(MIA_DISABLED,
            MIA_DISABLED));

   /* Enable the File-Close menu item. */

   WinSendMsg(ClassData.hMenu, MM_SETITEMATTR,
            MPFROM2SHORT(ID_FILE_CLOSE, TRUE),
            MPFROM2SHORT(MIA_DISABLED, FALSE));

   return;
}
```

CONTAINERAPP::FILECLOSE()

```
void ContainerApp::FileClose(HWND hwnd)
{

   int   i;
   ClassData.sCloseFile = TRUE;

   /* Enable the File-Open menu item. */

   WinSendMsg(ClassData.hMenu, MM_SETITEMATTR,
            MPFROM2SHORT(ID_FILE_OPEN, TRUE),
            MPFROM2SHORT(MIA_DISABLED, FALSE));

   /* Disable the File-Close menu item. */

   WinSendMsg(ClassData.hMenu, MM_SETITEMATTR,
            MPFROM2SHORT(ID_FILE_CLOSE, TRUE),
            MPFROM2SHORT(MIA_DISABLED,
            MIA_DISABLED));

   /* Free the text buffers */

   for (i = 0; i < ClassData.sLineCount; i++)
      delete [] ClassData.pszText[i];

   /* Reset screen buffer elements. */

   ClassData.sTopLine = 0;
   ClassData.sLineCount = 0;
   memset(&ClassData.rclUpdate, 0,
         sizeof(ClassData.rclUpdate));

   /* Force repaint of entire screen to erase it.
*/

   WinInvalidateRect(hwnd, NULL, FALSE);

   return;
}
```

CONTAINERAPP::CALCLINEPOSITION()

```
void ContainerApp::CalcLinePosition(HWND hwnd,
short
         sLineIndex, RECTL *prcl)
{
/*
...
*/
   return;
}
```

READFILETHREAD()

```
static void _Optlink ReadFileThread(void *pv)
{

   ContainerApp   *pCnrApp;
   FILE           *fp;
   int            rc;
   char           *psz,
                  szBuff[256];


   pCnrApp = (ContainerApp *)pv;

   /* Open the file. */

   if (!(fp = fopen(pCnrApp->
         ClassData.szFileName, "r")))
   {
      WinPostMsg(pCnrApp->ClassData.hClient,
               UM_ENDOFFILE,
               MPFROMSHORT(errno), 0);
      _endthread();
   }

   while (fgets(szBuff, sizeof(szBuff), fp))
   {
      /* Check the termination flag. */

      if (pCnrApp->ClassData.sCloseFile)
         break;

      if ((psz = strchr(szBuff, '\n')))
         *psz = '\0';

      psz = new char [strlen(szBuff)+1];
      strcpy(psz, szBuff);
      WinPostMsg(pCnrApp->ClassData.hClient,
               UM_LINEOFTEXT, MPFROMP(psz), 0);

      DosSleep(0);
   }

   rc = ferror(fp) ? errno : 0;
   fclose(fp);

   WinPostMsg(pCnrApp->ClassData.hClient,
         UM_ENDOFFILE, MPFROMSHORT(rc), 0);

   _endthread();
}
```

CONTAINERAPP::CREATECONTAINER()

```
HWND ContainerApp::CreateContainer(HWND hwnd)
{
```

```
   HWND            hContainer;
   FIELDINFO       *pfi,
                   *pfiRoot;
   FIELDINFOINSERT  fii;
   CNRINFO         cnri;
   SWP             swp;
   ULONG           ulLength;
   TID             tid;

/*
...
*/

   /* Start the container fill thread */

   if (_beginthread(FillContainerThread,
       NULL, 32768, this) == -1)
   {
     WinMessageBox(HWND_DESKTOP, hwnd,
       "Can't start container fill thread.",
       "ERROR!",   0, MB_OK | MB_ICONEXCLAMATION);
     WinDestroyWindow(hContainer);
     hContainer = NULLHANDLE;
   }

   return (hContainer);
}
```

FILLCONTAINERTHREAD()

```
static void _Optlink FillContainerThread(void *pv)
{

   ContainerApp   *pCnrApp;
   HAB            hab;
   HMQ            hmq;
   ULONG          ulFileCount;



   pCnrApp = (ContainerApp *)pv;

   /* Create a PM message queue so we can  use Win-
SendMsg()
  within this thread. */

   ulFileCount = 0;

   if ((hab = WinInitialize(0)))
   {
      if ((hmq = WinCreateMsgQueue(hab, 0)))
      {
         /* Fill the container */

         ulFileCount =
            pCnrApp->FillContainer
               (pCnrApp->ClassData.hContainer,
               NULL, pCnrApp->ClassData.szCurrDir);

         /* Clean up */

         WinDestroyMsgQueue(hmq);
      }
      WinTerminate(hab);
   }

   /* Tell client window the container is filled */

   WinPostMsg(pCnrApp->ClassData.hClient,
       UM_CNRFILLDONE, MPFROMLONG(ulFileCount),
       0);

   _endthread();
}
```

CONTAINERAPP::FILLCONTAINER()

```
ULONG ContainerApp::FillContainer(HWND hwnd,
      CNRREC *pcrRoot, char *pszDir)
{

   ULONG          i,
                  ulMaxFiles,
                  ulFindBuffSize,
                  ulFileCount;
   long           rc;
   HDIR           hdir;
   char           *pc,
                  *pszFileSpec,
                  *pszFullName;
   CNRREC         *pcr,
                  *pcrFirst;
   FILEFINDBUF3   *pffb,
                  *pffbFirst;
   RECORDINSERT   ri;
   HPOINTER       hptr;



   ulFileCount = 0;

   ulFindBuffSize =
      sizeof(*pffb) * FINDBUFF_ENTRIES;
   if (!(pffbFirst =
        new FILEFINDBUF3[FINDBUFF_ENTRIES]))
      return (0);

   if (!(pszFileSpec = new char[CCHMAXPATH * 2]))
   {
      delete [] pffbFirst;
      return (0);
   }
   pszFullName = pszFileSpec + CCHMAXPATH;

/*
...
*/

   while (!rc)
   {
      /* Allocate an array of container records */

      pcrFirst = (CNRREC *)WinSendMsg(hwnd,
                  CM_ALLOCRECORD,
                  MPFROMLONG(CNRREC_SIZE),
                  MPFROMLONG(ulMaxFiles));

/*
...
*/
```

```
        /* Bump pointers to the next entries */

        pc = (char *)pffb;
        pc += pffb->oNextEntryOffset;
        pffb = (FILEFINDBUF3 *)pc;
        pcr = (CNRREC *)pcr->mrc.preccNextRecord;
      }

/*
...
*/

        /* Bump pointers to next entries */

        pc = (char *)pffb;
        pc += pffb->oNextEntryOffset;
        pffb = (FILEFINDBUF3 *)pc;
        pcr = (CNRREC *)pcr->mrc.preccNextRecord;
      }

      /* Get the next batch of files */

      ulMaxFiles = FINDBUFF_ENTRIES;
      rc = DosFindNext(hdir, pffbFirst,
           ulFindBuffSize, &ulMaxFiles);
   }

   /* Clean up */

   DosFindClose(hdir);
   delete [] pffbFirst;
   delete pszFileSpec;

   return (ulFileCount);
}
```

CONTAINERAPP::SETVIEW()

```
void ContainerApp::SetView(HWND hwnd, USHORT
usView)
{

   CNRINFO     cnri;


   memset(&cnri, 0, sizeof(cnri));

   /* Set common attributes */

   cnri.cb = sizeof(cnri);
   cnri.flWindowAttr= CA_CONTAINERTITLE |
                      CA_TITLESEPARATOR;
   cnri.pszCnrTitle = ClassData.szCurrDir;

/*
...
*/

   return;
}
```


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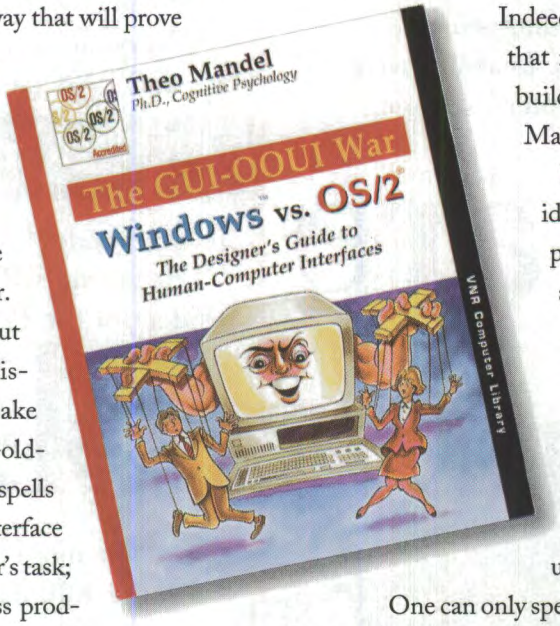
The GUI-OOUI War: Windows vs. OS/2

The Designer's Guide to Human-Computer Interfaces

by Theo Mandel, Van Nostrand Reinhold, $29.95

REVIEWED BY KEVIN BACHUS

Theo Mandel's *The GUI-OOUI War—Windows vs. OS/2*, is a book that should be forced on every Windows and OS/2 developer working today. An exceptionally clear, readable guide to the basics of good interface design, the book draws on examples from both Windows and OS/2 to lay out the fundamentals of program design in a way that will prove invaluable to software developers, and likely intriguing to curious users. If only half of the rules in this book were followed, the quality of most programs would increase tenfold.



What makes the book so useful is the level of detail provided by the author. Rather than offering dry theories about application development, Mandel discusses specific characteristics that make good programs. In one section, "The Golden Rules of User Interface Design," he spells out the six principles that make an interface consistent: "Sustain the context of a user's task; maintain consistency within and across products; keep interaction results the same; provide aesthetic appeal and integrity; use visual metaphors; and encourage exploration." And unlike so many other authors, Mandel then goes on to describe how to do just that.

While *The GUI-OOUI War* succeeds admirably when presenting techniques for interface design, it never delivers a crisp, succinct precis of the fight between Windows and OS/2. That's probably just as well; the subject is hardly under-documented.

Rather than destroy yet more trees in an ingenuous attempt to praise one OS over another, Mandel takes a much more realistic approach by developing the advantages and disadvantages of the Graphical User Interface model used in Windows 3.0 and 3.1, and the Object Oriented User Interface design of the OS/2 2.0 and 2.1 Workplace Shell. The book thus provides an enormous amount of help to developers seeking to work in both environments while minimizing unnecessary hype. Indeed, the author's conceptual approach means that most of the concepts can be used when building applications for other systems like Macintosh and X-Windows.

Particularly useful are the author's "key ideas." Offset from the main text, these brief paragraphs highlight important concepts and provide truly helpful insights. For example, "If you can't describe the function of an object in a single short sentence, then you don't have an object that will resonate with users." Mandel then goes on to explain how to design useful objects and how to prune out unnecessary ones.

One can only speculate that the publisher chose to emphasize the comparison of Windows and OS/2 in the book's title to entice prospective buyers. Alas, no such teasing was necessary. The book stands on its own by providing rock-solid advice and specific examples of implementation.

If you're looking for a tell-all fight between the two operating systems, skip *The GUI-OOUI War*. If you want to know what makes an application interface successful or you want to make a good program great, there's no better starting place. ◆

Kevin Bachus is a freelance technology writer based in Foster City, California.

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The Interface Group is sponsoring New Media Expo, a conference and exposition designed to draw together a complete range of multimedia technologies, products, and services. This event will provide an opportunity for the exchange of business and technical information among players in this emerging field. It will emphasize the increasing convergence of the computer, communications, consumer electronics, and entertainment industries. Market prospectus tutorials will provide detailed market analyses, along with an assessment of the prospects for new product and service concepts. Robert Carberry, president of Fireworks Partners, an IBM subsidiary, will give a keynote message, entitled "Blue Sky and Bottom Line." The future of interactive information will be on display by more than 200 exhibitors. Entry to the exhibit area costs $50; tutorials are $195 for a half day and $250 for a full day. Full access to the conference is $395 per day or $595 for the full Expo. Contact: The Interface Group, (617) 449-6600.

APRIL 19-21

NETWORKS EXPO '94

San Francisco, CA

Bruno Blenheim, Inc., will present the premiere of the Networks Expo San Francisco. The show, featuring more than 150 leading exhibitors in a Technical Product Showcase, will include hands-on training sessions and technical solution presentations in the following tracks: Client/Server Computing, Workgroup Applications, Network Management, and Communications. The conference program also offers more than 60 seminars, including tutorials in Application Development, Interoperability, Management Issues, Enterprise Computing, ATM, Emerging Technologies, Planning and Design, and others. The keynote speech will be delivered by William C. Keiper, president and CEO of Artisoft, on "The Emergence of Peer-Server Technology." The full conference and tutorial package is $575 before April 8; on-site registration is $775. Any one-day seminar and a three-day exhibit pass is $115. All three days of exhibits and one tutorial cost $295. Contact: BBI, (800) 829-3976

APRIL 24-29

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Atlanta, GA

More than 1,000 users of the Information Engineering Facility (IEF), a Texas Instrument CASE tool product, are expected to attend the 1994 IEF User Group Conference at the Atlanta Hilton & Towers. More than 80 educational sessions and eight technical seminars will be offered on topics ranging from Business Process Re-Engineering, to Development Coordination, Data Distribution for Multiple Platforms, and Transition Engineering. A highlight of the conference will be the introduction of Texas Instruments' new IEF for Client/Server applications.

Featured speakers will include Ed Metcalf, a senior instructor at the IBM Management Institute, who will lead a general session entitled "Kids Have It! Adults Don't!" A management tutorial, "Managing at the Speed of Change," will be presented by Al Brown, senior consultant at ODR Inc. The exhibitor showcase will feature the latest products and services from Texas Instruments and its alliance partners. Attendance costs $850 for those registering by April 22 and $1,050 at the door. Contact: IEF User Group Headquarters, (312) 644-6610.

APRIL 25-29

PSP TECHNICAL INTERCHANGE

San Francisco, CA

The Personal Software Products Technical Interchange and Device Driver Conference is the season's premiere OS/2 event. The Interchange, co-sponsored by Lotus and Computer Associates, will showcase the latest technology, products, and strategies for OS/2, LAN systems, and much more.

Some of the hottest names in the OS/2 industry will give keynote addresses, including Charles B. Wang, chairman and CEO of Computer Associates, Donald A. Haile, general manager of the Networking Software Division at IBM; and Lee Reiswig Jr., president of PSP. Guest speakers will include David Proctor, vice president of the Personal Software Products division at IBM, and John Soyring, Director of Strategic Relations at PSP.

For smaller vendors, the "Meet the Editors" session will provide an opportunity to present their products for recognition and review. A new track will help independent software publishers to position, launch, and sustain their products in a competitive marketplace. More than 200 other interactive sessions in 20 tracks will cover topics including new approaches in communications, device driver development, distributed systems management, LAN systems, and database application development. The latest in technologies and new products will be on display.

A Flower Power Welcome Reception is planned for opening night. There will be ethnic cuisine at the Streets of San Francisco reception, space aliens and Karaoke at the Back to The Future Special Event, and David Barnes plans to knock your socks off at the Closing Session.

For those registering by March 21, attending the full conference will cost $795; thereafter, the price rises to $895. Packages are available that will allow three or more staffers from the same company to attend the Expo at a $100 discount each. One-, two-, three-day, and exhibit floor-only admission tickets also are available. Contact: IBM Conference Center, (800) 872-7109. ◆



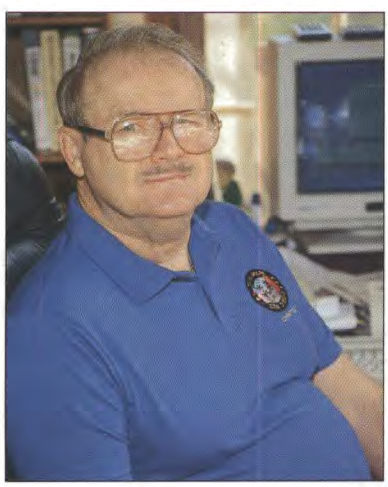
THE VIEW FROM CHAOS MANOR

A Moment in Time

BY JERRY POURNELLE

Bill Gates has a vision of the future: "A computer on every desktop and in every home." Hundreds of millions of computers, in homes, factories, doctors' offices, schools—everywhere, used by professionals, amateurs, nerds, and jocks. Needless to say, every computer will be running Microsoft applications under a Microsoft operating system. Those programs won't be perfect, but they'll be good enough, and people will know how to use them without reading manuals.

IBM has never described it officially, but I know what IBM's ideal future would look like.



IBM would deal with exactly 100 customers, each a corporation larger than IBM. Each would buy only IBM hardware and every bit of system software would be written and maintained by IBM. IBM would also furnish about two dozen customized applications for each customer, and a few very popular general purpose programs. There would be thousands and thousands of independent software developers buying developer kits (at prices that cover all the expenses of kit development and production), all writing for the IBM Operating System. There would be tens of thousands of non-IBM applications programs available, but few would buy them in preference to leased custom applications.

Most communications would be synchronous and communications outside the company would mostly be with other IBM customers. There would be a provision for non-IBM outsiders to connect, but it would be up to those outcasts to conform to protocols set by IBM and the customer Information System managers. IBM sales reps would only talk to computer gurus, and no customer MIS would want an IBM system to do anything IBM didn't approve. No one would try anything weird and no one would run software not certified by IBM.

I leave it to you to choose which vision is realistic.

Of course neither company is going to achieve its vision, but visions do influence actions. Microsoft takes steps toward Gates's future—and IBM often moves toward what I described.

Examples: When I find a bug in a Microsoft product, they fix it in a routine upgrade. The priority won't be high unless it's something that will affect a lot of users. On the other hand, if users complain about usability of the interface, Microsoft pays attention. They know people will do wrong-headed things, and they try to find ways to get them back on track, inventing wizards and cue cards, and working to get the interface consistent.

If I find a bug in an OS/2 program, IBM really worries about it; but if users complain about the interface, IBM doesn't much care. "You can do that from the command line. Read the manuals."

Similarly, if I have compatibility problems with OS/2 and some popular program or peripheral, IBM's answer usually boils down to "Look at all the wonderful things you can do with our system. Why would you want to use *that*? Don't do that, and you'll be happy."

Visions really do affect actions. OS/2 is a wonderful operating system for gurus, but if they expect it to become the OS for the rest of us, they'll need to change.

There's still time. The next computer revolution will be multimedia. As usual, the gamers are leading the way. If you want to see the future in action, get Wing Commander or Media Vision's Critical Path. Forget the games aspects; think what these could do in education, training, product presentation, advertising, and in communicating ideas. Then realize that both of these will play under OS/2 and die under Windows.

IBM has an insurmountable opportunity to reach the rest of us, but it won't last long. ◆

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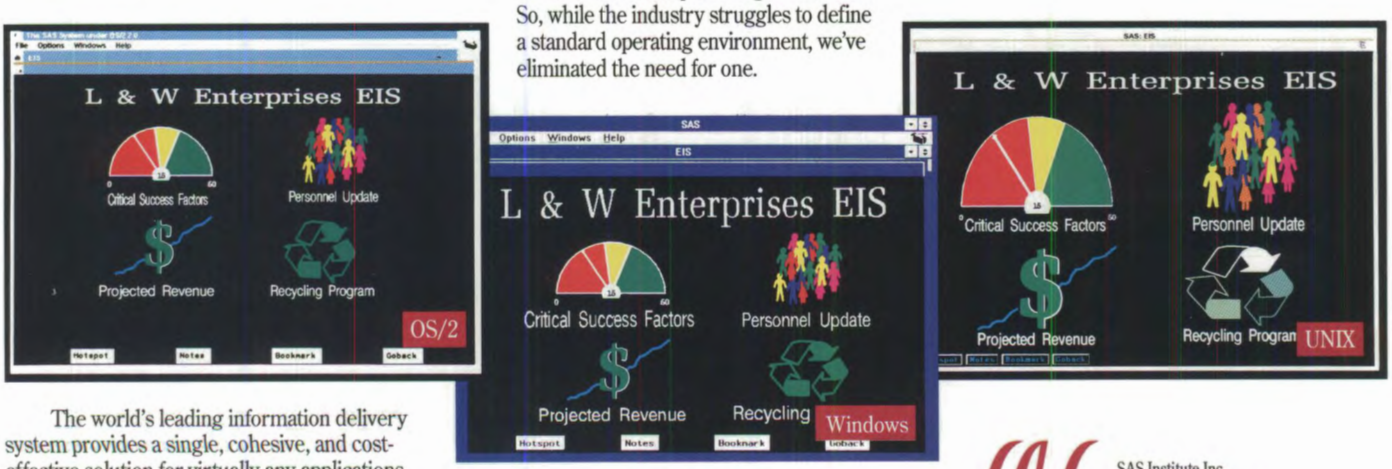
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